Workshop on Microwave Cavity Design for Axion Detection

Report of Contributions

https://indico.fnal.gov/e/10138

Contribution ID: **0** Type: **not specified**

Greetings and Welcome

Tuesday, 25 August 2015 09:00 (10 minutes)

Session Classification: Microwave Cavity Axion Searches - I

Contribution ID: **42** Type: **not specified**

ACE3P for RF structure simulation

Tuesday, 25 August 2015 11:10 (20 minutes)

RF codes such as Comsol and CST Microwave Studio are powerful tools but they have some limitations. Most notably, simulation throughput is limited by the availability of expensive (and therefore typically scarce) solver seats. Furthermore, high-fidelity geometry meshing may be difficult.

SLAC has developed ACE3P, a 3D parallel code for RF structure simulation that runs on the National Energy Research Scientific Computing Center (NERSC). Simulations may be run relatively quickly in batch mode with extremely high geometry fidelity. We present a brief introduction to ACE3P, some example simulations from other experiments, and an assessment of its utility for ADMX.

Primary author: BOWRING, Daniel (Fermilab)

Presenter: BOWRING, Daniel (Fermilab)

Session Classification: Microwave Cavity Simulations - II

Contribution ID: **43** Type: **not specified**

4-9 GHz Cavity Development at CAPP

Wednesday, 26 August 2015 09:00 (35 minutes)

I will present our experiences with developing expertise at cavity design. We were given a chance to run parasitically in an 8T magnet with a 60mm bore. This drove our choice of frequency regime. Because of the fixed geometry of the refrigerator and magnet we were required to have all mechanisms and actuators in close proximity to the dilution refrigerator and in a fringe field of 100-300G. We took this as an opportunity to also develop experience and expertise using piezo actuators.

Primary author: Dr THEMANN, Harry (Center for Axion and Precision Physics)

Presenter: Dr THEMANN, Harry (Center for Axion and Precision Physics)

Session Classification: Microwave Cavity Axion Searches - II

Contribution ID: **44** Type: **not specified**

Novel Aluminum-based High-Q Cold RF Resonators for ADMX

Wednesday, 26 August 2015 14:45 (30 minutes)

Improved aluminum refining techniques now provide high-quality, cost-effective high-purity aluminum samples. The high-purity aluminum will be better resonator material than copper because of its extremely low resistivity and high thermal conductivity at cryogenic temperature in strong magnetic fields. We will show material properties of high-purity aluminum and demonstrate possible improvement of the aluminum based ADMX resonator.

Primary author: YONEHARA, Katsuya (Fermilab)

Co-authors: CHOU, Aaron (Fermilab); DIXIT, Akash (University of Chicago); BOWRING, Daniel (Fermilab)

Presenter: YONEHARA, Katsuya (Fermilab)

Session Classification: Increasing Cavity Quality Factor

Contribution ID: **45** Type: **not specified**

Cross-spectral measurement techniques for axion cavity searches

Wednesday, 26 August 2015 11:05 (35 minutes)

The cross-spectrum of two measurements rejects uncorrelated signals, while retaining those that are correlated. Here we present some fundamental concepts of cross-correlation measurements and how they can be applied to axion cavity searches. One technique allows for improved resolution when observing the intrinsic thermal noise of cavities by rejecting uncorrelated amplifier noise. A different technique allows the spectrum outputs of two spatially well-separated cavities to be effectively combined.

We will also present a brief status report of a cavity-based search for ~26.6 GHz CDM axions.

Primary author: Dr PARKER, Stephen (The University of Western Australia)

Co-author: Prof. TOBAR, Michael (The University of Western Australia)

Presenter: Dr PARKER, Stephen (The University of Western Australia)

Session Classification: Axion (& Paraphoton) Microwave Cavity Searches - III

Contribution ID: **46** Type: **not specified**

Novel Microwave Cavities for Precision Measurement and Testing Fundamental Physics.

Wednesday, 26 August 2015 12:40 (35 minutes)

At the University of Western Australia we have a long history of developing high-Q cavities and transducers at microwave frequencies for applications for precision measurement, frequency standards, quantum information applications and testing fundamental physics. The latter includes hidden sector photon and axion experiments. Types of resonators include high-Q dielectric whispering gallery resonators, TE and TM mode resonators, reentrant cavity resonators, including new multi-post cavities.

A broad overview of the cavity types and uses will be given, with particular focus on applications to axion and hidden photon sector experiments.

Primary author: Prof. TOBAR, Michael (The University of Western Australia)

Presenter: Prof. TOBAR, Michael (The University of Western Australia)

Session Classification: Axion (& Paraphoton) Microwave Cavity Searches - IV

Contribution ID: **47** Type: **not specified**

University of Florida High-Frequency Microwave Cavity Research

Thursday, 27 August 2015 15:30 (30 minutes)

The axion is now by far the most promising candidate for the constitution of cold dark matter and this has generated a proliferation of searches around the world. While almost all CDM axion experiments use the Sikivie haloscope method, it is clear that to reach cosmological sensitivities at higher masses, new RF techniques that go beyond the current microwave cavity designs must be advanced. The University of Florida has been conducting research to extend the usefulness of haloscope detectors to higher axion masses. Computer simulations and analytical studies have validated the theory of using periodic post arrays and regulating vanes for tuning cavities at higher frequencies. A 12-vane cavity prototype is currently under development. Mode search schemes, necessary for scanning highly crowded frequency ranges, are being explored. The Pound-Drever-Hall frequency locking technique is also being investigated using a 2-cell segmented cavity prototype. Results of the studies and status of prototype testing will be presented.

Primary author: Mr STERN, Ian (University of Florida)

Presenter: Mr STERN, Ian (University of Florida)

Session Classification: Microwave Cavity Geometries - II

Contribution ID: **48** Type: **not specified**

Simulation of Superconducting Qubit Devices Using COMSOL

Tuesday, 25 August 2015 14:00 (30 minutes)

Over the last decade, superconducting qubits have emerged as strong candidates for a scalable quantum computing architecture. These devices deliver coherence times approaching milliseconds and basic coherent quantum logic operations have been demonstrated. First order models for superconducting qubits follow lumped circuit element representations, capturing a large portion of their behavior for practical operation. Despite their continued improvement in coherence times, quality factors, and measurement techniques, the qubits and their resonant readout circuitry still suffer from environment-induced noise. Current models of noise involve phenomenological explanations where uniformly distributed harmonic oscillators and two level systems simulate thermal excitations and intrinsic defects. To further investigate the microscopic sources of noise, we are developing simulations using COMSOL Multiphysics, a finite element solver with a broad range of capabilities including high frequency electromagnetics, thermodynamics, and any arbitrary physics described by differential equations. In this talk, we discuss some of the COMSOL modeling techniques currently applied in our study and the future direction of our larger qubit modeling effort.

Primary author: MATERISE, Nick (Lawrence Livermore National Laboratory)

Presenter: MATERISE, Nick (Lawrence Livermore National Laboratory)

Session Classification: Superconducting Microstrip Resonators - II

Contribution ID: **49** Type: **not specified**

Josephson Parametric Amplifiers: Theory and Application

Tuesday, 25 August 2015 15:40 (30 minutes)

Measurement of signals consisting of small numbers of microwave photons per unit bandwidth requires multiple amplification stages so the signal can be efficiently detected by room temperature electronics. However, even the lowest-noise commercially available microwave amplifiers add the equivalent of tens of photons of noise, making them insufficient for the amplification of single- or sub-photon signals. Recent interest in measuring photon-level signals from superconducting circuits has motivated the intensive development of Josephson parametric amplifiers (JPAs). Consisting of Josephson junctions shunted by a capacitor to form a nonlinear resonator, a typical JPA provides large gain (~20 dB) with nearly quantum-limited noise performance over instantaneous bandwidths of many MHz (depending on frequency band) that can be tuned over an octave. These devices have enabled a variety of experiments with superconducting qubits, including high-fidelity readout, quantum feedback, and observation of individual quantum trajectories. They also provide a valuable tool for the field of microwave quantum optics through their ability to generate squeezed states of the EM field. In this talk, I will discuss the operating principle and design considerations of a JPA circuit, their typical usage in qubit measurement, and their potential application to the detection of dark matter.

Primary author: EDDINS, Andrew (UC Berkeley)

Session Classification: Quantum Limited Axion Cavity Amplifiers - I

Contribution ID: **50** Type: **not specified**

Superconducting Microresonators

Tuesday, 25 August 2015 13:00 (1 hour)

Superconducting microresonators have attracted substantial attention over the past fifteen years due to a number of applications including photon detection, particle detection, and quantum devices. Our understanding of the behavior of these devices has advanced substantially during this period, particularly with regard to the influence of two-level systems on the dissipation and noise observed in these resonators, as well as nonequilibrium and nonlinear effects observed in the superconducting materials. Nonetheless, there are still significant gaps in our understanding in several areas, and there remains substantial opportunity for improvement and innovation as well as application to new problems. This presentation will outline both the recent developments and the remaining challenges in this field.

Primary author: Prof. ZMUIDZINAS, Jonas (California Institute of Technology)

Presenter: Prof. ZMUIDZINAS, Jonas (California Institute of Technology)

Session Classification: Superconducting Microstrip Resonators - I

Contribution ID: **51** Type: **not specified**

Introduction to RF-Structures and Their Design

Tuesday, 25 August 2015 09:50 (1 hour)

The numerical design chapter of the class addresses two topics: (1) Numerical Methods that include resonator design basics, introduction to Finite Difference, Finite Element and other methods, and (2) Introduction to Simulation Software that covers 2D and 3D software tools and their applicability, concepts for problem descriptions, interaction with particles, couplers, mechanical and thermal design, and finally a list of tips, tricks and challenges.

Primary author: Dr KRAWCZYK, Frank (Los Alamos National Laboratory)

Presenter: Dr KRAWCZYK, Frank (Los Alamos National Laboratory)

Session Classification: Microwave Cavity Simulations - I

Contribution ID: **52** Type: **not specified**

LC Circuit Based Low Frequency Axion Search

Wednesday, 26 August 2015 13:45 (20 minutes)

A status update of prototype testing for LC circuit based axion searches will be presented. This will include initial results for various inductor geometries and tuning mechanisms.

Primary author: Ms CRISOSTO, Nicole (University of Florida ADMX)

Presenter: Ms CRISOSTO, Nicole (University of Florida ADMX)

Session Classification: Low Frequency Axion Searches

Contribution ID: **53** Type: **not specified**

Cavities march in step

Thursday, 27 August 2015 09:00 (30 minutes)

To reach high frequencies while maintaining a good B^2V, the axion detector will require either a complex multi-cell structure or the operation of a number of cavities together. In order to employ a number of cavities that are power-combined in phase, the cavity resonant frequencies will need to be identical. This talk outlines a technique developed by Pound to lock a klystron to a resonator and elaborated by Drever and Hall for locking lasers to optical resonators. This Pound-Drever-Hall method is widely used, notably by LIGO, to maintain lock of up to five resonant lengths. It employs phase modulation of the electromagnetic waves incident on the cavity, followed by mixing of the generated sidebands with the reflected carrier, and then by phase-sensitive demodulation to generate an error signal. The error signal may be used in a servo loop to adjust the cavities' resonant frequency.

Primary author: TANNER, David (University of Florida)

Presenter: TANNER, David (University of Florida)

Session Classification: Active Microwave Cavities - I

Contribution ID: **54** Type: **not specified**

Axion Dark Matter Detection with Microwave Cavities - Overview of Challenges

Tuesday, 25 August 2015 09:10 (30 minutes)

In this talk I will present an overview of the axion dark matter haloscopes that use microwave cavities to resonantly enhance the conversion rate of axions to potentially detectable levels. I will layout the number of design challenges facing experimental efforts moving forward.

Primary author: Dr CAROSI, Gianpaolo (Lawrence Livermore National Laboratory)

Presenter: Dr CAROSI, Gianpaolo (Lawrence Livermore National Laboratory)

Session Classification: Microwave Cavity Axion Searches - I

Contribution ID: **55** Type: **not specified**

Cavity Design considerations for ADMX

Tuesday, 25 August 2015 09:40 (10 minutes)

Here we will present a historical context for the design considerations that lead to the ADMX cavity system from Phase 0 - Phase I.

Session Classification: Microwave Cavity Axion Searches - I

Contribution ID: **56** Type: **not specified**

Open Cavity Resonators - Project Orpheus

Wednesday, 26 August 2015 10:30 (35 minutes)

Overview and progress of the open cavity resonator concept.

Primary author: RYBKA, Gray (University of Washington)

Presenter: RYBKA, Gray (University of Washington)

Session Classification: Axion (& Paraphoton) Microwave Cavity Searches - III

Contribution ID: **57** Type: **not specified**

Active Q Cavities

Thursday, 27 August 2015 09:30 (30 minutes)

An overview of the R&D on increasing the quality factor of cavities using active feedback will be given.

Session Classification: Active Microwave Cavities - I

Contribution ID: **58** Type: **not specified**

Photonic Bandgap Cavities

Thursday, 27 August 2015 10:20 (30 minutes)

This talk will be a basic overview of Photonic Band Gap cavity design.

Primary author: LEWIS, Samantha (University of California - Berkeley)

Presenter: LEWIS, Samantha (University of California - Berkeley)

Session Classification: Microwave Cavity Geometries - I

Contribution ID: **59** Type: **not specified**

Directly characterization of cavities with a bead-pull technique

Thursday, 27 August 2015 11:20 (30 minutes)

This talk will present an overview of the bead-pull technique that is being used to characterize cavities for ADMX and ADMX-HF.

Session Classification: Microwave Cavity Geometries - I

Contribution ID: **60** Type: **not specified**

A Prototype Piezoelectric Drive System for ADMX

Tuesday, 25 August 2015 16:30 (20 minutes)

Here we will present work on a prototype rotary piezoelectric drive system to adjust tuning rods in the ADMX experiment.

Session Classification: Microwave Cavity Motion Control

Contribution ID: **61** Type: **not specified**

An RF sputtering system for thin film superconducting cavity R&D

Wednesday, 26 August 2015 16:15 (30 minutes)

Here we will outline an RF sputtering system that has recently been installed at UC Berkeley with the goal of developing superconducting thin film cavities for axion searches.

Primary author: SIMANOVSKAIA, Maria (UC Berkeley)

Presenter: SIMANOVSKAIA, Maria (UC Berkeley)

Session Classification: Increasing Cavity Quality Factor

Contribution ID: **62** Type: **not specified**

The ADMX-HF Experiment

Wednesday, 26 August 2015 09:35 (35 minutes)

Here we will present an overview of the ADMX-HF experiment at Yale University and discuss the lessons learned in the development of a 4-6 GHz microwave cavity which has recently gone through its first commissioning data taking.

Primary author: Prof. VAN BIBBER, Karl (UC Berkeley)

Presenter: Prof. VAN BIBBER, Karl (UC Berkeley)

Session Classification: Microwave Cavity Axion Searches - II

Contribution ID: **63** Type: **not specified**

Accelerating cryogenic axion searches with one and two mode squeezed states.

Thursday, 27 August 2015 13:10 (40 minutes)

The search rate of cryogenic axion cavity search will soon be limited by fundamental quantum fluctuations of the microwave field. In this talk, I will describe how this noise can partially be overcome using quantum squeezing of the microwave field. In contrast to what is often thought to be the case, I will show that it is in principle possible to measure both quadratures of the axion induced microwave field without adding measurement noise.

Primary author: Prof. LEHNERT, Konrad (JILA, University of Colorado)

Presenter: Prof. LEHNERT, Konrad (JILA, University of Colorado)

Session Classification: Quantum Limited Axion Cavity Amplifiers - II

Contribution ID: **64** Type: **not specified**

Microstrip Resonator Design work at LLNL

Tuesday, 25 August 2015 14:30 (20 minutes)

We will present initial simulation work for microstrip resonators at LLNL.

Primary author: Dr HORSLEY, Matt (LLNL)

Presenter: Dr HORSLEY, Matt (LLNL)

Session Classification: Superconducting Microstrip Resonators - II

Contribution ID: **65** Type: **not specified**

Resonator design strategies for high and low mass axion searches

Thursday, 27 August 2015 16:00 (30 minutes)

TBD

Primary author: CHOU, Aaron (Fermilab)

Presenter: CHOU, Aaron (Fermilab)

Session Classification: Microwave Cavity Geometries - II

Contribution ID: **66** Type: **not specified**

Electronic Tuning with Non-Linear Dielectrics

Thursday, 27 August 2015 14:40 (30 minutes)

Since dielectric materials inserted into a resonator cavity cause a permittivity- There are a number of dielectric materials which might be suitable for this application, but none have been sufficiently well studied in low-temperature, high magnetic field environments. The key issue is whether the necessary level of tunability can be achieved without prohibitively large energy dissipation. We are planning to test several materials and fabricate a prototype resonator.

Primary author: Dr SONNENSCHEIN, Andrew (Fermilab)

Presenter: Dr SONNENSCHEIN, Andrew (Fermilab)

Session Classification: Active Microwave Cavities - II

Contribution ID: **67** Type: **not specified**

Microwave and Millimeter-wave Cavity Research and Develpment at SLAC

Thursday, 27 August 2015 16:30 (30 minutes)

We present ongoing research and development in advanced microwave and millimeter-wave cavity design and fabrication at SLAC National Accelerator Laboratory. This research is primarily focused on improving the performance of accelerating structures with optimized cavity design for reducing breakdowns and increasing Q-factor, distributed coupling and improved fabrication with micro-machining and diffusion bonding. Future areas of interest will also be presented.

Primary author: Dr NANNI, Emilio (SLAC National Accelerator Laboratory)

Presenter: Dr NANNI, Emilio (SLAC National Accelerator Laboratory)

Session Classification: Microwave Cavity Geometries - II

Contribution ID: **68** Type: **not specified**

Magnetic Field Limits of SRF Cavities

Wednesday, 26 August 2015 15:45 (30 minutes)

This talk will discuss the ultimate limitations for high Q0 operation of SRF cavities, including theoretical predictions and experimental measurements. Various SRF materials are considered and realistic expectations for maximum magnetic fields on the walls of the cavity are presented.

Primary author: POSEN, Sam (Fermilab)

Presenter: POSEN, Sam (Fermilab)

Session Classification: Increasing Cavity Quality Factor

Contribution ID: **69** Type: **not specified**

The ADMX Sidecar Cavity

Overview of the ADMX Sidecar cavity system

Contribution ID: **70** Type: **not specified**

A Varactor Tuned Microstrip SQUID amplifier for axion searches

Tuesday, 25 August 2015 15:10 (30 minutes)

Here we will overview the SQUID amplifier that has been developed for the ADMX experiment.

Primary author: Mr O'KELLEY, Sean (UC Berkeley)

Presenter: Mr O'KELLEY, Sean (UC Berkeley)

Session Classification: Quantum Limited Axion Cavity Amplifiers - I

Contribution ID: **71** Type: **not specified**

Electronic Tuning & Coupling of Cavities

Thursday, 27 August 2015 15:10 (20 minutes)

He we will present an overview of R&D efforts to employ electronic tuning and coupling of microwave cavities.

Primary author: Dr CAROSI, Gianpaolo (Lawrence Livermore National Laboratory)

Presenter: Dr CAROSI, Gianpaolo (Lawrence Livermore National Laboratory)

Session Classification: Active Microwave Cavities - II

Contribution ID: **72** Type: **not specified**

Progress on mode-locking cavties at U. of Florida

Thursday, 27 August 2015 11:50 (20 minutes)

Here we will discuss some of the work that has been done on mode-locked cavities at U. of Florida

Session Classification: Microwave Cavity Geometries - I

Contribution ID: **73** Type: **not specified**

Slow Wave Cavity Axion Search

Wednesday, 26 August 2015 13:35 (10 minutes)

Here we outline the concept of using reactive endcaps to lower the frequency of a cylindrical cavity.

Primary author: Dr CAROSI, Gianpaolo (Lawrence Livermore National Laboratory)

Presenter: Dr CAROSI, Gianpaolo (Lawrence Livermore National Laboratory)

Session Classification: Low Frequency Axion Searches

Contribution ID: **74** Type: **not specified**

Superconducting photonic band gap structures for high-current applications

Thursday, 27 August 2015 10:50 (30 minutes)

We report the results of recent design and testing of several 2.1 GHz superconducting radio-frequency (SRF) photonic band gap (PBG) resonators. PBG cells have great potential for outcoupling long-range wakefields in SRF accelerator structures without affecting the fundamental accelerating mode. Here we describe the results of our efforts to fabricate 2.1 GHz PBG cells with round and elliptical rods and to test them with high power at liquid helium temperatures.

Primary author: Dr SIMAKOV, Evgenya (LANL)

Co-authors: Dr SHCHEGOLKOV, Dmitry (Los Alamos National Laboratory); ARSENYEV, Sergey (MIT)

Presenter: Dr SHCHEGOLKOV, Dmitry (Los Alamos National Laboratory)

Session Classification: Microwave Cavity Geometries - I

Contribution ID: **75** Type: **not specified**

Generation and Reconstruction of Propagating Quantum Microwaves

Thursday, 27 August 2015 13:50 (30 minutes)

Propagating quantum microwave signals are promising building blocks for quantum communication and quantum computation. In particular, such itinerant quantum microwaves can be generated by Josephson parametric amplifiers (JPAs) in the form of squeezed states. At the same time, JPAs are widely used as low noise amplifiers for the detection of microwave signals on the single photon level. In this work, we characterize the basic properties of flux-driven JPAs at millikelvin temperatures. We investigate the squeezed states generated by the flux-driven JPAs with a dual-path setup. Squeezed coherent states could be generated by sending coherent states into a JPA. Alternatively, displacement operations can be applied to squeezed states using a directional coupler. We discuss our experiments in the context of remote state preparation and quantum teleportation with propagating microwaves.

Primary author: ZHONG, ling (Walther Meissner Institute)

Presenter: ZHONG, ling (Walther Meissner Institute)

Session Classification: Quantum Limited Axion Cavity Amplifiers - II

Contribution ID: **76** Type: **not specified**

Searching for Hidden Photons

Wednesday, 26 August 2015 13:15 (20 minutes)

A "hidden photon" is a possible new particle, similar to the photon but with a small mass and with only a tiny coupling to electrically charged particles. Searches for hidden photons – whether as dark matter or as a new force carrier – have a great deal of overlap with corresponding axion searches. However, they tend to be significantly easier for two reasons: 1) static B-fields are NOT required, and 2) the astrophysical constraints are much weaker, making the allowed part of parameter space easier to reach. I will briefly review the landscape of hidden-photon theory and searches.

Primary author: MARDON, Jeremy (Stanford)

Presenter: MARDON, Jeremy (Stanford)

Session Classification: Axion (& Paraphoton) Microwave Cavity Searches - IV

Contribution ID: **77** Type: **not specified**

Piezoelectric Tuning of Microwave Cavities for Axion Searches

Tuesday, 25 August 2015 16:10 (20 minutes)

The Axion Dark Matter eXperiment (ADMX) searches for dark-matter axions by looking for their resonant conversion to microwave photons in a strong magnetic field. In the event that ADMX rules out axions in the 500MHz - 2GHz frequency range, new technologies and cavity geometries will need to be explored to find higher mass axions. ADMX Sidecar is a higher frequency pathfinder experiment that uses a miniature resonant cavity to search for axions in the 3.5GHz-6GHz frequency range. The Sidecar cavity sits on top of the main ADMX cavity and relies greatly upon piezo motors for tuning and for antenna coupling. Here I discuss the progress of this experiment and give an update on our success with piezoelectric tuning/coupling.

Primary author: Mr BOUTAN, Christian (University of Washington)

Presenter: Mr BOUTAN, Christian (University of Washington)

Session Classification: Microwave Cavity Motion Control

Contribution ID: **78** Type: **not specified**

Electric Tiger

Wednesday, 26 August 2015 16:45 (20 minutes)

Electric Tiger is a project consisting of designing, building, and taking axion exclusion data with a prototype rectangular prism cavity. The cavity includes regions of dielectric to modify the shape of the resonant modes of the cavity in such a way that coupling to axions is enhanced. The motivation, design, and status of Electric Tiger will be presented and the outlook for the prototype and beyond will be discussed.

Primary author: Mr SLOAN, James (UW)

Co-authors: Mr GARRETT, Daniel (UW); RYBKA, Gray (University of Washington); Mr PATEL, Kunal (UW)

Presenter: Mr SLOAN, James (UW)

Session Classification: Open Discussion & Presentation of New Ideas

Contribution ID: **79** Type: **not specified**

Reentrant Cavity for Low Mass Axion Search

Wednesday, 26 August 2015 14:05 (20 minutes)

Simulations and initial measurements of a reetnrant cavity designed to explore lower frequencies in a fixed magnet bore volume.

Primary author: DIXIT, Akash (University of Chicago)

Co-authors: CHOU, Aaron (Fermilab); Dr SONNENSCHEIN, Andrew (Fermilab)

Presenter: DIXIT, Akash (University of Chicago)

Session Classification: Low Frequency Axion Searches

Contribution ID: **80** Type: **not specified**

Primer on Superconducting Radiofrequency Cavities

Wednesday, 26 August 2015 15:15 (30 minutes)

This overview will outline the motivation and concepts behind superconducting radio-frequency microwave cavities, primarily in the context of accelerator cavities.

Primary author: BOWRING, Daniel (Fermilab)

Presenter: BOWRING, Daniel (Fermilab)

Session Classification: Increasing Cavity Quality Factor

Contribution ID: **81** Type: **not specified**

Lattice QCD Input to Axion Cosmology

Thursday, 27 August 2015 17:00 (20 minutes)

Here we describe recent work to place a lower bound on the axion mass from lattice QCD calculations.

Primary author: Dr EVAN, Berkowitz (LLNL)

Presenter: Dr EVAN, Berkowitz (LLNL)

Session Classification: End of Workshop Discussion & Open Floor to New Ideas

Contribution ID: **82** Type: **not specified**

Workshop Close-Out

Thursday, 27 August 2015 17:20 (20 minutes)

End of the workshop discussion.

Primary author: Dr CAROSI, Gianpaolo (Lawrence Livermore National Laboratory)

Presenter: Dr CAROSI, Gianpaolo (Lawrence Livermore National Laboratory)

Session Classification: End of Workshop Discussion & Open Floor to New Ideas