



**THE OHIO STATE UNIVERSITY**

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**Snowmass  
Instrumentation Frontier  
IF10/Radio  
Amy and Albrecht**



# Instrumentation Frontier IF10

- These were the LOIs submitted to IF that involved radio frequencies directly or tangentially:

File	Title	contact	new	cc	IF	IF01	IF02	IF03	IF04	IF05	IF06	IF07	IF08	IF09
<b>TOTALS</b>			0	0	0	0	0	0	0	0	0	0	0	0
<a href="#">IF1-CF2-003.pdf</a>	Tunable plasma haloscope	katherine.dunne@fysik.su.				x								
<a href="#">IF1_IF0-CF2_CF0-146.pdf</a>	Spin-triplet superconductivity - a new foundation for magnetically resistive	huang44@llnl.gov				x								
<a href="#">IF1_IF0-CF2_CF0-156.pdf</a>	Resonant halo axion detectors for the mass range 16-41 ueV	chelsb89@uw.edu				x								
<a href="#">IF1_IF0-CF2_CF0-193.pdf</a>	Radio frequency quantum upconverters: precision metrology for fundamental	kuenstns@stanford.edu				x								
<a href="#">IF1_IF0-CF3_CF0_Rosen-167.pdf</a>	Tunable quality factor resonators for high energy applications	rosen10@llnl.gov				x								
<a href="#">IF1_IF0-NF10_NF0-CF1_CF2_Golwala-C</a>	Phonon-mediated KID-based detectors for low-mass dark matter detection	golwala@caltech.edu				x								
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<a href="#">IF1_IF2-177.pdf</a>	Superconducting detector facility for HEP science	cecil@anl.gov				x	x							x
<a href="#">IF1_IF2-AF5_AF7_Nanni-162.pdf</a>	Transduction for new regimes in quantum sensing	tony.heinz@stanford.edu				x	x							
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<a href="#">IF2_IF0_Erik_Shirokov-187.pdf</a>	Kinetic inductance detectors for long-wavelength photon detection	shiro@uchicago.edu					x							
<a href="#">IF2_IF10-NF10_NF0-UF1_UF3-144.pdf</a>	IceCube-Gen2: the next generation wide band neutrino observatory	karle@icecube.wisc.edu					x							
<a href="#">IF2_IF6_Yu-181.pdf</a>	The microwave SQUID multiplexer for cosmology and cryogenic particle	cyndiayu@stanford.edu					x				x			
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<a href="#">IF6_IF2-EF6_EF0_Peter_Gorham-039.p</a>	Calorimetric picosecond timing planes for future 100 TeV-scale collider	gorham@hawaii.edu					x				x			
<a href="#">IF7_IF9-CF2_CF4_Austin_Minnich-117.p</a>	Towards quantum-limited transistor microwave amplifiers	aminnich@caltech.edu										x		x

- Many were cross-listed with other things, especially IF1 (quantum sensors), IF2 (photons) <sup>2</sup>



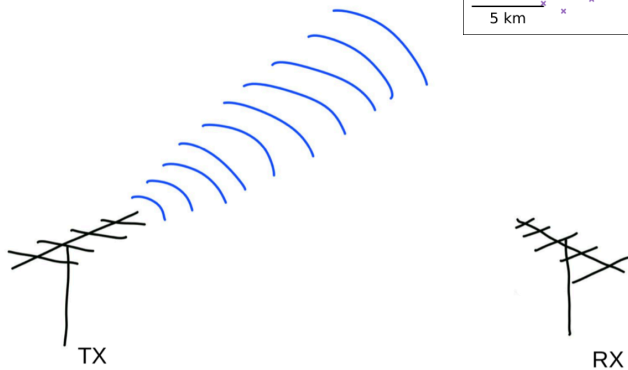
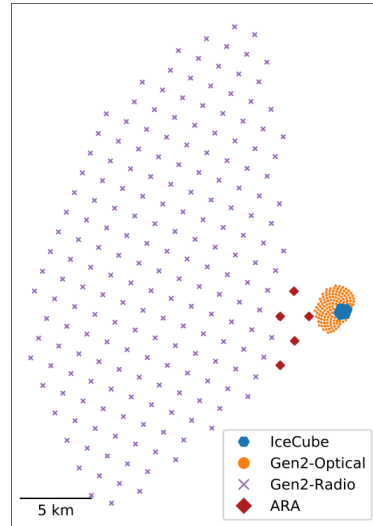
# Radio detection of neutrinos

- One submitted among these experiments

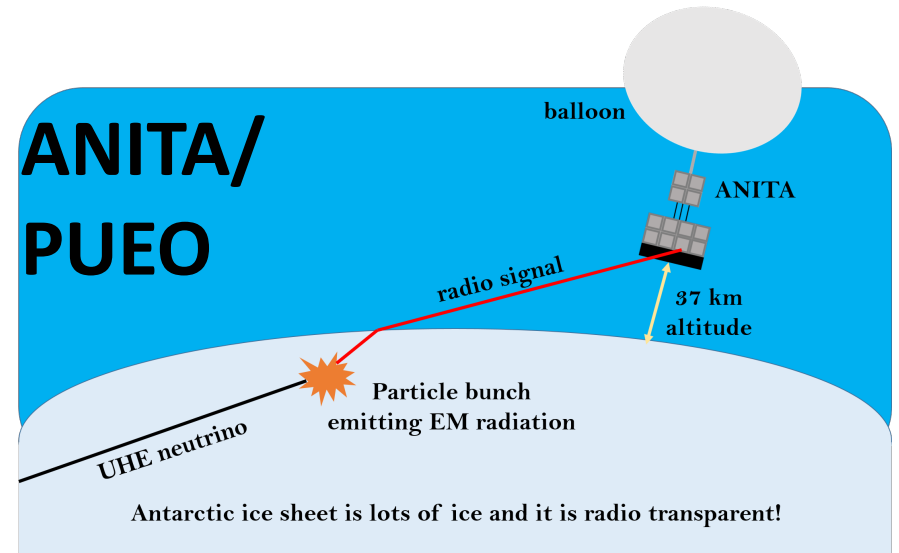
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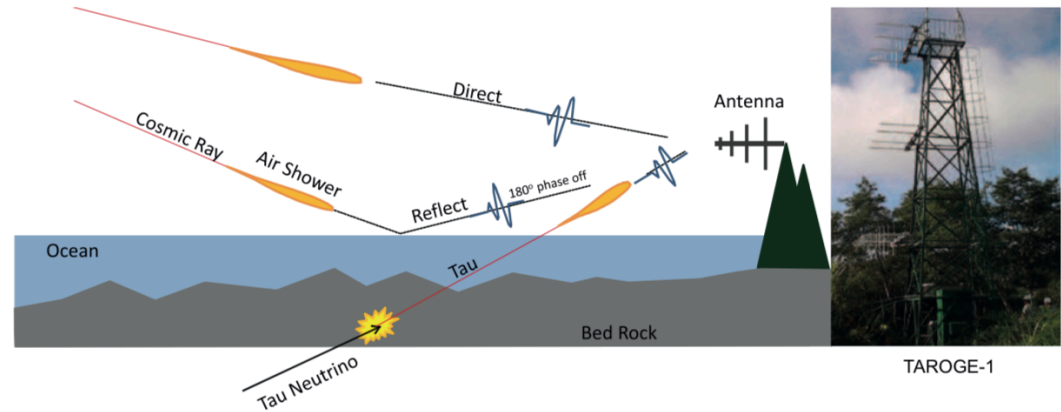
# Radio Neutrino Projects



- Transmitter (TX) broadcasts a radio signal into a volume
- receiver(s) (RX) monitor this same volume



Graphic: Oindree Banerjee



• Pure ice is low-loss for radio: field attenuation lengths ~1 km



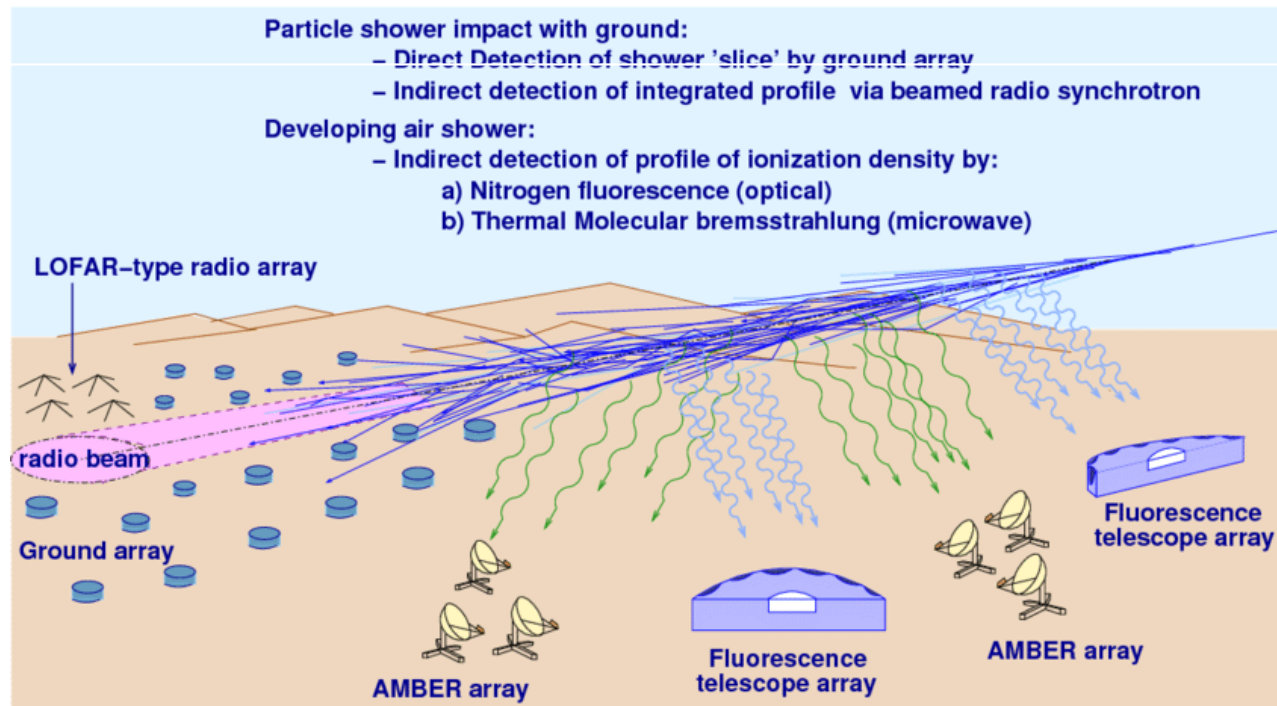
# Radio detection of neutrinos

- We reached out to the usual suspects working on instrumentation for these projects
- Plan is to write an overview whitepaper, heavily citing existing work and filling in any gaps



# Radio cosmic ray detection

- Radio CR detection folks prefer to stay in “mainstream” CR white papers





# Instrumentation Frontier IF10

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# Future mm-wave detectors

- As mentioned previously there is a plan for a whitepaper on future mm-wave detectors
- Contact: Pete Barry ([pbarry@anl.gov](mailto:pbarry@anl.gov))





# ACE calorimetry with radio

- Want to make sure this one has a home

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# Any other stragglers?

- Any others that were classified in other IF areas that might be well suited for IF10?

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- Suggestion: might be useful to denote in the main LOI spreadsheet their grouping in whitepapers? <sup>11</sup>



# Going forward

- At least the two white papers for mid-March
  - Radio detection of neutrinos
  - Future of mm-wave detectors
  - Any others?