



# DUNE BSM Physics Goals for DUNE Physics Week

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DUNE Physics Week @ Fermilab  
November 15, 2017

# BSM Physics Group Organization



- ▶ Co-conveners - **Jae Yu** and **Alex Sousa**
  
- ▶ Sub-Group Leaders
  - ◉ **Low-Mass Dark Matter** - **Jae Yu** (UT Arlington) and **Animesh Chatterjee** (UT Arlington)
  - ◉ **Light Sterile Neutrinos and Large Extra Dimensions** - **Alex Sousa** (U. Cincinnati)
  - ◉ **Non-Standard Interactions (NSI)** - **Celio Moura** (U. Fed. ABC)
  - ◉ **Heavy Neutrinos** - **Athans Hatzikoutelis** (U. Tenn. Knoxville)
  - ◉ **Simulations and Software** - **Animesh Chatterjee** (UT Arlington)
  
  - ◉ Wiki, web presence, and document organization - **Filip Jediny** (CTU - Prague)
  
- ▶ *Note: Other physics topics also being explored*
  
- ▶ DUNE BSM Wiki: <https://cdcvs.fnal.gov/redmine/projects/dunebsm/wiki>
  
- ▶ BSM Physics group meets bi-weekly, Tuesdays, 9 am Fermilab time
  
- ▶ Mailing list: [dune-physics-bsm@fnal.gov](mailto:dune-physics-bsm@fnal.gov)

# Timeline for Physics TDR



## Timeline and Milestones

|                        |  |
|------------------------|--|
| June 2017              | <ul style="list-style-type: none"><li>• High-level outline, scope, and milestones defined.</li><li>• Document workflow established.</li></ul>  |
| Aug 2017 (collab mtg)  | <ul style="list-style-type: none"><li>• Initial look at structure with WG Conveners.</li></ul>   |
| Fall 2017              | <ul style="list-style-type: none"><li>• WGs present section outlines, lists of key plots/tables (with dates for technical feasibility of each).</li><li>• Iteration and adjustments where necessary.</li><li>• LArSoft integration complete wherever applicable.</li></ul> |
| Jan 2018 (collab mtg)  | <ul style="list-style-type: none"><li>• Demonstrate “Jan 2018” prototype plots/tables.</li></ul>   |
| May 2018 (collab mtg)  | <ul style="list-style-type: none"><li>• Demonstrate “May 2018” prototype plots/tables.</li><li>• Also, checkpoint/review of all high-level scientific goals.</li><li>• Text writing starts ramping up.</li></ul>   |
| Sept 2018 (collab mtg) | <ul style="list-style-type: none"><li>• Supplemental internal documentation ready for review (Requirements TBD. The idea is to give the collaboration enough detail on each analysis to properly vet the results.)</li><li>• Text writing well underway</li></ul>          |
| Jan 2019 (collab mtg)  | <ul style="list-style-type: none"><li>• Analyses frozen. Final plots and numbers assembled.</li></ul>  |
| Feb 2019               | <ul style="list-style-type: none"><li>• Begin internal review of complete draft.</li></ul>   |
| April 2019             | <ul style="list-style-type: none"><li>• Final version ready for external review.</li></ul>   |



[https://wiki.dunescience.org/wiki/Physics\\_TDR\\_Volume\\_Development](https://wiki.dunescience.org/wiki/Physics_TDR_Volume_Development)

- ▶ DUNE Physics Week a great opportunity to consolidate ongoing BSM Physics Work in preparation for January 2018’s plot/table demonstration

# DUNE Physics Week Goals



- ▶ Converge on list of plots/tables for each sub-group
  - Include both key plots/tables to be shown in the TDR, and plots/tables in supporting documentation
  - Work on producing preliminary versions
  - Identify obstacles to production of plots/tables and compile solutions/needs
  - Identify needs for external inputs (other DUNE groups, sensitivities from other experiments, etc.)
  - Assess computing needs
  - **Compile list of tasks providing opportunities for new people to get involved**
  
- ▶ Attend sessions from other groups that may be relevant to the above (e.g. LBL Physics, Reconstruction)
  
- ▶ Start structuring BSM Physics section of TDR (will adapt to page/sectioning constraints when those are defined)
  
- ▶ Understand plans from other groups for ND modeling to be used in January 2018 demonstration plots

# BSM Physics Sessions



Wed 15/11

|       |   |
|-------|---|
| 09:00 | <b>45 - Physics Week BSM Goals</b>  |
|       | <b>46 - Light Dark Matter Group Plans</b><br><i>Black Hole (2NW), Fermilab</i>                    |
|       | <b>47 - Sterile Neutrinos and LED Group Plans</b><br><i>Black Hole (2NW), Fermilab</i>            |
| 10:00 | <b>48 - Non-Standard Interactions Group Plans</b><br><i>Black Hole (2NW), Fermilab</i>            |
|       | <b>49 - Software, Simulations, and Computing Group Plans</b><br><i>Black Hole (2NW), Fermilab</i> |
|       | <b>50 - Break</b><br><br><i>Small Dining Room (1SW), Fermilab</i>                                 |
| 11:00 | <b>51 - Working Time</b><br><br><i>Black Hole (2NW), Fermilab</i>                                 |
| 12:00 |   |

Thu 16/11

|       |  |
|-------|--|
| 12:00 | <b>4 - BSM</b><br><i>Yu, Jaehoon, Sousa, Alexandre</i> |
| 13:00 |  |
| 14:00 |  |
| 15:00 |  |
| 16:00 |  |
| 17:00 | <b>Interim Updates</b>                                 |
| 18:00 | <i>Race Track (7XO), Fermilab</i>                      |

Fri 17/11

|       |  |
|-------|--|
| 12:00 | <b>4 - BSM</b><br><i>Sousa, Alexandre, Yu, Jaehoon</i> |
| 13:00 |  |
| 14:00 | <b>Summary Presentations</b>                           |
| 15:00 | <i>West Wing (10NW), Fermilab</i>                      |

- ▶ Interaction Area in “Small Dining Room (WH1SW)” for other times