



# Working Group B: Plans and Timeline

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# Benchmark Models

- Benchmark models interface with WGA by helping define goals for sensitivity.
- Models are identified as being interesting visions of dark matter, attempting to reasonably cover theory space.
- We already have a partial list identified (primarily work by D Hooper (CF4), LT Wang (EF4), and TMPT (CFI)).
  - Models are designed to be of interest to a larger segment of the CF community, rather than just CFI necessarily.
  - Decision was made to focus on models of interest to the cosmic frontier rather than rely to EF-driven models.
- There is room and need for community input to make sure that nothing important is missing.

# Example Models I

- Example models that have been identified include:
- **MSSM: Largely being handled by CF4, based on pMSSM scans.**
  - Phenomenology well under control.
  - Targets for direct detection are already well-identified.
  - We will inherit these models from CF4 (Matchev, SLAC group).
- **Universal Extra Dimension (UED) Model**
  - Also inherited from CF4 (KC Kong).
  - Phenomenology and direct detection predictions well understood.
- **Electroweak triplet scalar model**
  - Discussed by R. Hill at this meeting.
  - Typically small direct rates, but promising for indirect searches.

# Example Models II

- **NMSSM : 'dark light Higgs'**
  - Proposed to address CoGeNT, but of interest in general for a larger parameter space.
  - Connected to LHC Higgs properties, and predicts a light(ish) WIMP with light mediator.
  - Theory contact: LT Wang
- **Asymmetric Dark Matter Model**
  - Favors a few GeV-scale Dirac WIMP with good direct/collider prospects but very little in the way of indirect prospects.
- **Iso-spin Violating Dark Matter**
  - Relax assumptions concerning quark coupling universality leading to an interesting reshuffling of the role of direct detection target choices.
  - Theory contact: D Sanford

# Example Models III

- Inelastic WIMP
  - Initially proposed to address DAMA, but current incarnation will generalize WIMP mass, splitting, and coupling.
- ... (insert your favorite model here)

# Model Timeline

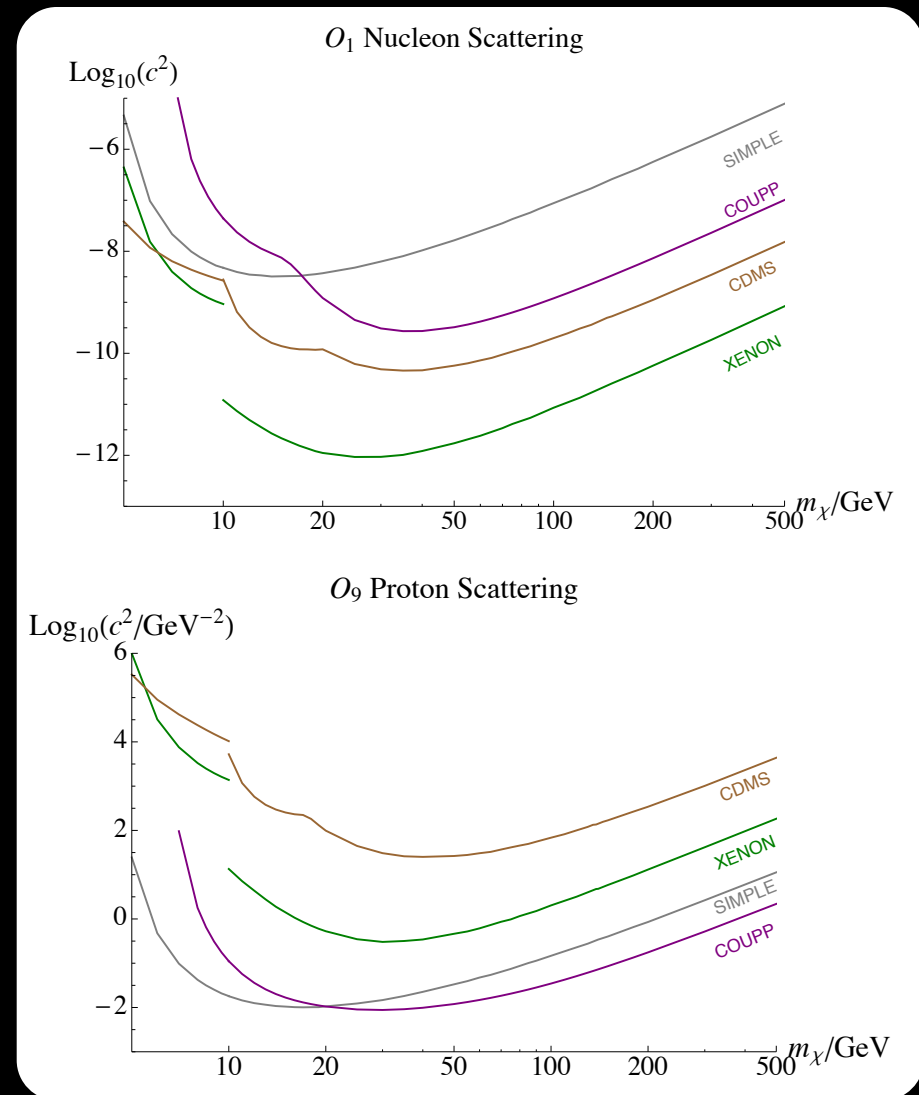
- **March 29: Document containing models posted to WG B and wiki.**
  - Key parameters defined and enumerated.
  - Where appropriate, simplifying relations such as relic density will be imposed to reduce the parameter space.
  - Community feedback solicited.
  - Volunteers/assignments to flesh out phenomenology.
  - Where possible, results between models can be shared.
- **April 26: Target date to have key phenomenological results updated.**
  - Understand the viable and interesting parameter space.
  - Pass on targets to CFI and other interested groups (CF2?).
  - Some models or collections of models will be phenomenological publications.

# Model Timeline

- May 29 - 31 : Models vetted at Snowmass KITP Theory Meeting.
  - May 30 is the extra dimensions day.
  - May 31 is the SUSY and cosmic model day.
- This is an aggressive schedule, but this part of WG B sets up some of the other components, so we will try to stick to it.

# Other WGB Activities

- Exploration of alternate WIMP signals: momentum-dependent, dipole-interacting, nuclear response, etc.
- A couple of people have expressed interest at this meeting.
- **Timeline:**
  - Next couple of weeks will put together interested experimentalists with relevant theorists.
  - Goal is to have identified a feasible/interesting set for study by end of March.
  - For this set, final product is exploration of how the breadth of direct searches impacts the parameter space.



Fitzpatrick, Haxton, Katz, Lubbers, Xu  
JCAP 302, 4 (2013) [1203.3542]  
& [1211.2818]



# Room for More!

- Other activities are less planned, but there is room for a lot more.
- Community involvement through feedback (e.g. presentation of the benchmark models) and theory events such as the KITP Snowmass meeting.