



# **Stefano Profumo**

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## ***Introduction to CF2*** ***“Indirect Dark Matter Detection”***

**Cosmic Frontier Workshop  
SLAC, March 6-8 2013**



# Snowmass2013

**Long term planning** exercise for HE physics community initiated by American Physical Society's Division of **Particles and Fields**

Goal: to develop the community's **long-term physics aspirations**

By-product: to communicate the **opportunities for discovery** in HE physics to the broader **scientific community** and to the **Government**

Keep this in mind for talks and deliverables!

**Opportunities/Aspirations:**  
**what excites us re: future more than current status!**



# CF2: Indirect DM Detection

**Conveners:** Jim Buckley (Wash.U.), Doug Cowen (Penn S.),  
Stefano Profumo (UC Santa Cruz)

**Charge** includes:

- **Topics:** Detection and study of WIMP dark matter through its annihilation or decay to *photons*, *anti-matter*, and *neutrinos*
- **Experiments:** IceCube, Fermi, AMS, ANTARES, KM3NeT, MAGIC, HESS, VERITAS, PAMELA, CTA, GAPS, ...



## CF2: what's on the menu

### March 6:

- **Summary and Current Status** (11AM)
  - Abazijian (GR), Halzen (nu), Moskalenko (CR)
- **Experimental/Observational Overview**
  - (1:30PM): Smith (GR), Grant (nu), Jeltema (multiwave), Boezio (CR)
  - (4PM): GR: Siegal-Gaskins, Linden, Su, Drlica-Wagner (Murgia canc.)



## CF2: what's on the menu

### March 7:

- **Future Facilities** (9AM)
  - Wood (CTA), Moiseev (CALET, Gamm400), von Doetinchem (GAPS), Grant (PINGU), Pretz (HAWC), Koshio (HyperK)
- **Future Detection Technology** (1:30PM)
  - Yokohama (Hybrid Photodet.), Byrum (LAPPD), Otte (Silicon PMs), Nishimura (ASICS)



## CF2: what's on the menu

**March 7:**

- **Theoretical Astrophysics and Particle Physics Issues (4PM)**
  - Kuhlen (Nbody status), Ferrer (Nbody issues), Zurek (non-WIMPs)

Also on March 7: Round table discussions (11AM):

**(1) Future Experimental Directions**

**(2) Benchmark Definitions:** DM density/velocity; CR propagation/E loss



## CF2: what's on the menu

**March 8:**

- **Theoretical Particle Physics Issues** (4PM)
  - Cotta (SUSY ind.), Rizzo (SUSY compl.), Shepherd (cross. sym.)

Also on March 8:

**CF2 Summary** (Buckley)



# Overlap with “Complementarity” CF4 working group

Joint sessions with CF4:

- this session (overview)
- 4PM Session (overview, GR)
- Thursday 9AM session (Future facilities)

**Complementarity** Document → more from Konstantin Matchev



# Deliverables and Expectations from this meeting

- Start brainstorming on 30-page **CF2 Subgroup summary**
- Strategic discussion on **future facilities**
- **Benchmark** definition
- Agreed-upon **format** to show constraints (e.g. issue of NT versus other indirect detection avenues)



# Timeline for Snowmass Process: CF2 Working group

- We generated the **charge** (FNAL planning meeting)
- SLAC meeting + Whitepapers: discussion to **determine what goes into the CF2 report**, areas where we need to do **work** (e.g., benchmark models...)
- Provide **input** to the **complementarity** group (e.g.,  $\sigma v$  plots)
- Write the **CF2 report** (in advance of the Snowmass)
- Input for the **final CF report**