

CYGNUS TPC Workshop Jan 2016



CYGNUS TPC

Workshop Jan 2016

Welcome - plan, people, lunches etc

Objectives:

- A discussion towards a CYGNUS proposal
- What TPC design issues can we agree
- Decide a strategy... physics objectives, LOI
- Can we agree a proto-design... scale?

Issues:

- How to be competitive
- Realistic about costs per unit sensitivity
- What is the minimum technology to do the job?

CYGNUS TPC

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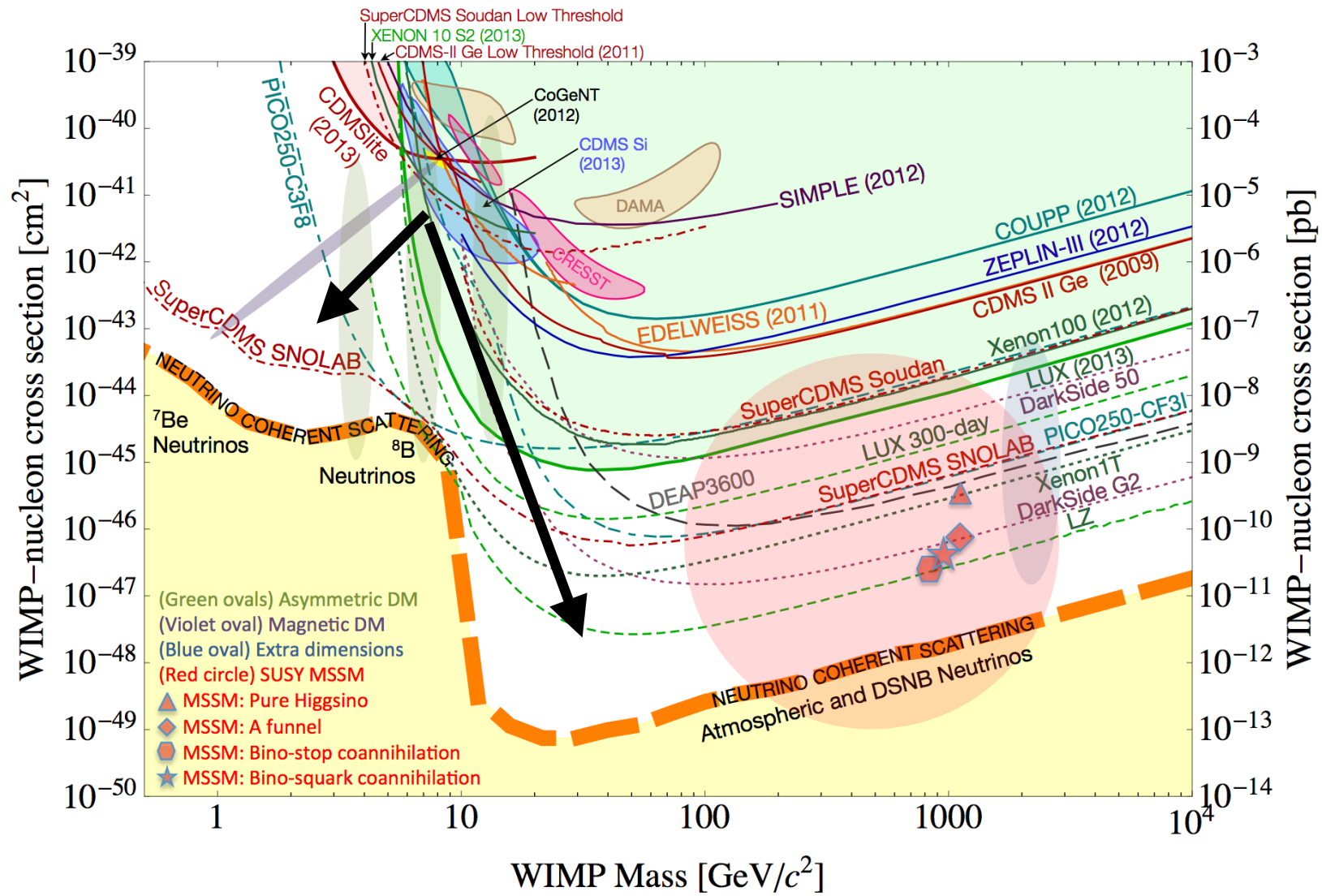
Issues:

- How to be competitive
- Realistic about costs per unit sensitivity
- What is the minimum technology to do the job?
- Key is to get sufficient directional sensitivity but with “zero” background and be competitive (i.e. high target mass and/or low threshold)

Some Recent Advances

- Z-fiducialisation using minority carriers
 - Achieved in $\text{CS}_2:\text{CF}_4:\text{O}_2$ - makes zero background feasible in scale-up
- New use of SF_6 as -ve ion gas, with minority carriers
 - Increases F target mass by $\sim \times 5$
 - Improves operational safety
- Production of large LAr TPCs at FNAL & elsewhere
 - SBND 4 x 4 x 4m under construction, DUNE, CERN, Icarus
 - Possible lighter/cheaper fabrication techniques - Carbon Fibre
- New large area charge readout technologies
 - ThGEMs, micromegas, microdot, hybrid MWPC-GEMs
- New low cost electronics (1\$/ch scale)
 - ATLAS, BNL (LAr)...
 - Multiplexing and grouping technologies
- New Southern Hemisphere Underground Site
 - Stawell (Australia)
 - Better control of galactic signal systematics
- XENON 1t result in 6 months...

CYGNUS



AGENDA (Rough)

Friday 8th January

9am-1pm

-Welcome to Boulby - Sean

discussion of different visions for next generation directional TPC designs (no particular order):

-Kobe/Japan concept - Kentaro

-"DRIFT" concept - Dan SI

-"HT concept - Neil, Anthony, Frederic

-"MIMAC concept - Daniel

-Sven/D3? - Sven?

-Optical concept - Jocelyn?

-James?

-Others?

LUNCH

2pm-7pm

Discussion of physics goal

Further discussion on concepts in relation to goal

Discussion on common areas (daq, gas, readout, vessel, radon, background, site....)

3pm - 5pm Underground Visit

7.30 pm Dinner in Whitby

AGENDA (Rough)

Saturday 9th January

9am-1pm

Agreement on common areas?

Discussion towards joint concept design

R&D priorities towards common concept

LUNCH

2pm-5pm

LOI discussion, redrafting and agreement

Funding opportunities and plans

Round up discussion

Next meeting and other organisation