Jodi Cooley Lecture-2 Questions

All questions had first pass answering during the Q&A session. Original questions listed mostly without correction for grammar/spelling. Where a slide number was given it is shown.

Q1 [slide 55] How did DAMA/LIBRA get their crystals to such purity?
That is a good question. I have heard different stories about this, but they needed to start with very pure powders for growing the crystals or repeatedly pull them.

Q2 [slide 57] How are the regions of interest and sidebands defined?
The region of interest are single hit events in the 2-6 keV region. The sidebands are the multiple hit events in the 2-6 keV region and the single-hit events in the 6 – 10 keV region.

Q3 [slide 59] Why do WIMPS interact w/ the nucleus of the target instead of the electrons?
WIMPs are weakly interacting massive particles. They are proposed to have masses greater than a proton and interact with the nucleus through the weak force. The weak force

Q4 [slide 68] how do they keep the NTD on the critical temperature?
A heater with an electrothermal feedback system can be used to maintain critical temperature.

Q5 [slide 71] What are the dimensions of this mask?
The detectors will be 100 mm in diameter and 33.3 mm in thickness.

Q6 Is anybody utilizing molecular vibrations to detect dark matter ?
Yes. This definitely qualifies as an area that needs more R&D. Here are some preprints:

- https://arxiv.org/abs/2007.15750
- https://arxiv.org/pdf/1402.0466.pdf
- https://arxiv.org/abs/1705.03016 (another related, interesting idea using color centers)

Q7 [slide 98] Why is the neutrino background suddenly much worse at 10GeV?
See slide 47. This is where the 8B neutrinos and solar neutrinos dominate.

Q8 [General] Are there any experiments using Bose Einstein Condensates ?
Not that I know of.