



Contribution ID: 76

Type: **Poster presentation**

## **The ASTAROTH Project - a novel technique for NaI(Tl) crystal cool-down**

*Monday, 7 September 2020 18:58 (6 minutes)*

ASTAROTH is an R&D project aiming at improving the physics reach of direct dark matter (DM) detection experiments based on NaI(Tl) scintillating crystals, like SABRE, ANAIS, COSINE. These collaborations aim at testing the dark matter interpretation of the DAMA annual modulation signal, with the same target and techniques. ASTAROTH instead proposes a technology development that lowers the detection energy threshold, making it possible for the first time to observe sub-keV recoils. This would allow disentangling different DM-induced modulation models, thus possibly restricting the parameter space of a surviving DM candidate. A lower threshold can be achieved by technological advancements, such as immersing the target NaI(Tl) crystals in a cryogenic medium, and reading them out with Silicon PhotoMultipliers (SiPM), which feature lower dark noise than PMTs at  $T < 150$  K. The perfect cooling medium is liquid Argon, a scintillator that can double as veto detector. At this stage, ASTAROTH is in a technology demonstration phase, where an innovative controlled crystal cooling technique is being developed. This will allow characterizing the crystals performance in a broad range of temperatures, and selecting the best working point. This contribution will outline the physics potential of the ASTAROTH project and describe the details of the cooling technique.

### **Internet talk**

#### **Is this abstract from experiment?**

No

#### **Name of experiment and experimental site**

N/A

#### **Is the speaker for that presentation defined?**

Yes

### **Details**

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**Session Classification:** Poster Session