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DarkSide-20k and the Direct Dark Matter Search with Liquid Argon

Monday 2 December 2019 12:00 (30 minutes)

Dual phase noble liquid Time Projection Chambers (TPCs) offer a competitive and scalable way to search for dark matter directly via elastically scattering off of detector target nuclei and electrons. The Global Argon Dark Matter Collaboration (GADMC) is undertaking an ambitious global program from the extraction and purification of Underground Argon (UAr), depleted in 39Ar which reduces the internal background, to the development of 25cm2 Silicon Photo Multiplier (SiPM) modules capable of resolving single photoelectrons. DarkSide-20k is the next stage of this program and will be the next generation dual phase Argon TPC. DarkSide-20k will be housed in the Gran Sasso underground laboratory (LNGS) and has an exposure goal of ˜100 tonne-years with zero instrumental background in expectation of a WIMP-nucleon cross section of 10-47 cm2 for a WIMP mass of 1TeV/c2 during a 5-year run. An overview of the DarkSide experimental program will be presented with a focus on the upcoming DarkSide-20k detector and the new technologies involved.

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