

Foreword

The CYGNUS conference serie brings together the scientific community working on both theoretical and experimental aspects of directional dark matter detection. The original meeting, CYGNUS 2007 was held at the Boulby Underground Laboratory (UK). The second, CYGNUS 2009, was held at MIT in Cambridge, Massachusetts (USA), in June 2009. The third CYGNUS workshop (CYGNUS 2011) on directional dark matter detection has been organised by LPSC Grenoble and held at AUSSOIS (France), in June 2011.

Directional detection of galactic Dark Matter is a promising search strategy aiming at identifying Weakly Interacting Massive Particle (WIMP) as such by taking advantage of the expected direction dependence of WIMP-induced events toward the constellation Cygnus, due to the rotation of the Solar system around the galactic center. Directional detection requires the simultaneous measurement of the energy and the 3D track of low energy recoils, which is a common challenge for all current projects of directional detectors.

Directional detection of Dark Matter has been first proposed as a powerful tool to identify genuine WIMP events as such, even with a low angular resolution detector (Spergel 1988). More than twenty years later, this conference aimed at giving a revue of directional detection of Dark Matter. We focussed on: phenomenological studies, technical progress on gaseous detectors, data analysis (3D, sense recognition, ...) and experimental results from directional prototypes. There is indeed a worldwide effort toward the development of a large directional detector and all current projects were presented at the CYGNUS 2011 conference.

The conference provided a stimulating forum for discussion of the latest results in the field of directional dark matter. It was a great success thanks to the enthusiasm of the participants and the high quality of their exposures.

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