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CCD low noise readout and control, digital signal processing for DAMIC experiment



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Date de mise en ligne : Monday 2 November 2015

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Equipe thématique «Matière Noire et Energie Noire»; Expérience: DAMIC

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Title : CCD low noise readout and control, digital signal processing for DAMIC experiment

The DAMIC (DARk Matter In CCDs) experiment uses fully depleted, high resistivity CCDs to search for low mass (below 10GeV/C²) dark matter particles. The low detection threshold (actually 50eV) and the high spacial resolution of the CCDs contribute to a very high sensitivity for a detector which mass is only 100g (DAMIC 100 under construction at SNOLAB, Canada). The CCD control and low noise readout is a major contribution to improve the sensitivity and lower the detection threshold in the context of the next generation detector of 1kg (DAMIC 1000).

The candidate PhD will participate to the development and test of ASICs dedicated to the control and readout of the CCDs, and the optimization of signal to noise ratio with digital processing. The CCD readout will be made of a fast and low noise analog front end and a fast and accurate (>16bit) ADC, digital processing will be implemented on a FPGA.

Front end electronics could be designed on CMOS 0,35 μ or 0,18 μ from AMS. CCD control -clocks and biases generation - will be designed on CMOS 0,18 μ HV from AMS.

Lieux de travail : LPNHE - Paris, Fermilab et université de Chicago (USA) et SNOLAB (Canada)

Déplacements éventuels: les lieux de travail ci-dessus

Documentation:

- <http://lpnhe.in2p3.fr/>

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