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IFIC TWOCRYST contributions

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Magnetic and electric dipole moments of fundamental particles provide powerful probes for physics within and beyond the Standard Model. For the case of short-lived charm baryons, these properties have not been experimentally accessible due to the difficulties imposed by their lifetimes.
In view of this situation, a small fixed-target experiment at the LHC is proposed, ALADDIN [1], which will enable a unique program of measurements of charm baryon electromagnetic dipole moments
The first step towards this feat is the TWOCRYST project, a proof of concept that will demonstrate the feasibility of ALADDIN and deliver tangible input on critical aspects that are only accessible in simulations. With that goal, a dedicated particle detector has been built in the time frame of 1 year. This particle detector, operating inside a vacuum environment, reuses elements from the VELO [2] detector, specifically the silicon pixel sensors, the front-end ASICs and the Hybrid GBTx circuit inside the vacuum, as well as the Optical Power Board (OPB) outside the vacuum.
The LHCb-IFIC group has been very involved in the development of this detector, contributing with:
• The Vacuum Feedthrough Board (VFB): a PCB that connects the inside and the outside of the vacuum for the electrical signals
• Two multitasks rigid-flexible PCBs: located inside the vacuum and responsible of transmitting all the control and data signals among ASICs, HyGBTx and VFB.
• The detector power supply system: architectural design, installation and commissioning of the power supply system for the whole detector.
• A SCADA system: that provides a user interface and security measurements to control the detector power supply system.

[1] https://cds.cern.ch/record/2905467?ln=es
[2] https://home.cern/news/news/experiments/new-lhcb-velo

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