Progetto	Upgrade of the AMS-02 Online Monitoring with Machine Learning Techniques
Esperimento / sigla proponente	AMS2
Laboratorio ospitante	CERN
Contact person presso il laboratorio	Mike Capell
Periodo previsto:	01/11/23 - 31/03/24
Sezioni e tutor proponenti:	Bologna, Perugia, Roma 2 e TIFPA
Descrizione attività (max 1000 caratteri)	AMS-02 is a high-energy experiment that was installed on the International Space Station in 2011 with the Shuttle mission STS-134. It has been operating continuously since then, measuring all components of charged cosmic rays with high precision. Operating a high-energy experiment in space is very challenging, due to the ever changing environment (solar exposure, radiation level, …), which is why AMS is monitored and controlled from the Payload Operation Control Center (POCC) located at CERN. The successful candidate will work in the AMS POCC to learn the AMS-02 monitoring system, which is based on an InfluxDB database and a Grafana web visualization tool. These tools are commercial standards and studying them will give the student a background on systems that are widely employed in fields other than high-energy physics. The student will upgrade the monitoring system (slow control and data quality) for the Silicon Tracker of the AMS-02 detector. The upgraded monitoring system will also include new components to be installed for the Layer-0 upgrade in 2025. Part of the work will involve using machine learning techniques to evaluate deviations in detector performance and to separate those from the variations occurring from changes in the orbital environment.
Altre indicazioni: (max 500 caratteri)	The activity will occur at the AMS-02 Payload Operation Control Center (POCC) at CERN. The AMS POCC is a unique facility that maintains constant communication with NASA. For three months, the student will work at the world's largest high-energy physics laboratory, collaborating with the largest space laboratory ever built.
Facility che il laboratorio ospitante mette a disposizione	Office space at CERN, experiment computing at CERN.
Note:	