

AMS-02: a Superconducting Spectrometer for the Search of Dark Matter and Antimatter on the ISS

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The Alpha Magnetic Spectrometer (AMS) is a state of the art detector for the extraterrestrial study of matter, antimatter and missing matter. After a successful precursor flight on STS-91 in May 1998, AMS is being refurbished for a three years long mission on the ISS, scheduled by NASA on UF-4 in January 2004. The AMS-02 configuration includes a large Superconducting Magnet, equipped with a Transition Radiation Detector, an high precision, 8 layer Silicon Tracker, a Ring Imaging Cherenkov Detector, a Time of Flight system and an Electromagnetic Imaging Calorimeter. The detector has an acceptance of $0.5 \text{ m}^2 \text{ sr}$. AMS-02 will measure with unprecedented accuracy the composition of Cosmic Rays up to energies exceeding several TeV. In addition it will be the only detector able to measure at the same time charged Cosmic Rays and high energy gamma rays. We discuss the physics potential of AMS-02 to search for dark matter, antimatter and to explore other astrophysical issues.