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AMS-02 RICH detector in space: status and results

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Content

AMS-02 is a high-energy particle physics magnetic spectrometer installed on the International Space Station (ISS) in May 2011, successfully operating and taking data since then. The goal of the experiment is to carry out precise measurements of cosmic rays in the energy range from GeV/n to TeV/n by means of specialized sub-detectors. The Ring Imaging Cherenkov (RICH) provides AMS with a precise measurement of the particle velocity and charge. The AMS-02 RICH layout follows a proximity focusing design with two radiators. The central part of the radiator is formed by 16 sodium fluoride (NaF) tiles with a refractive index $n = 1.33$, surrounded by 92 tiles of silica aerogel with a refractive index $n = 1.05$. The challenges and the experience gained operating the detector in space for 5 years will be presented. RICH critical parameters are constantly monitored to ensure detector integrity and optimal performance. The long term stability of the system and the effect of varying environmental conditions will be addressed with special focus on the aerogel radiator. Finally, examples of the use of the RICH detector for the measurement of the isotopic composition of light elements in CR will be shown.

Summary

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