The analysis strategy for the measurement of the electron flux with CALET on the International Space Station

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The CALorimetric Electron Telescope (CALET), operating aboard the International Space Station since October 2015, is an experiment dedicated to high-energy astroparticle physics. The primary scientific goal of the experiment is the measurement of the electron+positron flux up to the multi-TeV region, which can provide unique information on the presence of nearby astrophysical sources and possible signals from dark matter. Other important goals are the ones relative to the flux of nuclear species from proton to iron up to tens of TeV/nucleon and to gamma-ray astronomy up to a few TeV. In order to accomplish these tasks, the CALET instrument was carefully designed exploiting a calorimeter solution composed by three detectors: CHarge Detector (CHD), IMaging Calorimeter (IMC) and Total AbSorption Calorimeter (TASC). This geometry allows for an excellent electromagnetic shower energy resolution (2%), a very high proton rejection factor (10^5) and a relatively large geometric factor (0.1 m^2 sr). In this contribution, we present the analysis strategy employed for the measurement of the electron+positron flux, which is divided in two main steps. The first step consists of a group of selections to obtain a sample of well reconstructed candidates, removing particles outside the detector acceptance and particles with a charge $Z>1$, while keeping a high selection efficiency for electrons. The second step consists of a final rejection to remove the residual proton background: this is the most crucial point of the analysis since in cosmic rays protons are more abundant than electrons by a factor 100-1000. Proton rejection is performed using two different methodologies. We will demonstrate that, at low energies, it is enough to use a simple single cut that makes use of the reconstructed longitudinal and lateral profile, whereas, at high energies, it is necessary to use a more powerful cut that combines all detector information by the use of a multivariate analysis technique. Finally, we will show that this rejection algorithm leads to very stable performances at all energies, strongly reducing the impact of the associated uncertainty, which is the main source of systematic uncertainty in the high energy region.