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Science Results of 9 Years of Measurements from CALET Operation on the International Space Station

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Operating nearly flawlessly for nine years from October 2015, the Calorimetric Electron Telescope (CALET) has been measuring the properties of the cosmic radiation. CALET was designed to achieve the primary objectives of measuring the spectra of electrons/positrons through the TeV energy decade to search for nearby sources and/or signatures of dark matter processes and measure the spectra of the hadronic components up to a PeV. Combined with secondary science goals of measuring the relative abundances of the ultra-heavy galactic cosmic ray (UHGRC) component above $Z=28$ (nickel) and past $Z=40$ (zirconium) and of measuring gamma-rays potentially in the TeV region, CALET's measurements are designed to provide detailed investigations of the processes involved in cosmic-ray acceleration, including understand the relationship between volatile and refractory material in this process, as well as the subsequent propagation in the galaxy. CALET also monitors the sky for X-ray and soft gamma-ray transients using the CALET Gamma-Ray Burst Monitor (CGBM). Additionally, CALET has demonstrated exceptional sensitivity to space weather events vis-à-vis the observation of variability in the flux of geomagnetically trapped particles, especially using on-board measurements of precipitating electrons. The science results obtained during the first 9 years of CALET operation, including the breaks in spectral indices observed in the all-electron and hadronic spectra, will be presented and discussed.

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