

Citation for the 2018 RAS Chapman Medal: Professor Emma J. Bunce

The 2018 Chapman Medal in Geophysics is awarded to Professor Emma J. Bunce.

Professor Emma J Bunce receives the 2018 Chapman medal for her outstanding contributions to the understanding of the physical properties of the large-scale current systems flowing in the magnetospheres of the gas giant planets, and in particular to their connection with the polar auroras.

In these investigations of magnetosphere-ionosphere coupling, Emma has employed data analysis with allied theoretical modelling to a broad range of related key topics in the physics of Jupiter's and Saturn's magnetospheres, including Saturn's ring current and its response to magnetospheric modulation by the solar wind, the currents and dynamics of Jupiter's and Saturn's dayside magnetospheric cusp (with particular reference to the origin of Jupiter's polar X-ray emissions), and magnetosphere-ionosphere coupling currents more generally (including their connection with the polar auroral oval emissions).

In particular she was the first to analyse simultaneous observations of Saturn's UV auroras by the Hubble Space Telescope and in situ observations of magnetospheric currents in the high-latitude magnetosphere measured by the Cassini spacecraft, which clearly established a connection between upward-directed field-aligned currents flowing near the boundary of open and closed field lines and the auroral oval, as proposed in earlier modelling work.

These were amongst the first major observational results on magnetosphere-ionosphere coupling obtained in situ from high-latitude data at a gas-giant planet. As a member of the Cassini magnetometer team, Emma has established herself as the key team member who unites the in-situ spacecraft observations at Saturn with the auroral observations (in the UV, X-ray and IR wavebands) whilst also placing them into context with existing theoretical models.

For these reasons, Professor Bunce is awarded the Royal Astronomical Society's Chapman Medal.