



Finding diamagnetic cavity crossing events at comet 67P/Churyumov-Gerasimenko using multiple instruments of the Rosetta Plasma Consortium

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One of the main scientific objectives of the Rosetta mission is to investigate the diamagnetic cavity of comet 67P/Churyumov-Gerasimenko. Beside the magnetic signatures of the cavity, both electron and ion signatures were reported after the Halley encounter near the cavity boundary. We employed combined data of two instruments of the Rosetta Plasma Consortium (RPC) to identify and study diamagnetic cavity crossing events. We have found that both charged particle signatures are present at 67P as well. Using electron data from the Ion Electron Sensor (IES) to complement the Magnetometer (MAG) data enabled us to work out a search criterion for the cavity crossing events based on a unique signature we identified in the electron data. Although this search criterion is insufficient to find all the cavity events, we were able to find an abundance of almost one hundred cavity crossings in the data obtained in the summer of 2015. This unexpectedly high number of events allowed us to study their common features, as well as the shape and extent of the diamagnetic cavity in the terminator plane. The results suggest that in the summer of 2015 there was a global cavity around comet 67P, which has a highly variable outer boundary but a well-defined maximal extent. We could also determine the maximal extent of the cavity.