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The Solar-Wind Interaction with Comet Churyumov-Gerasimenko

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The instruments of the Rosetta Plasma Consortium are providing close-up views of the solar-wind interaction with a comet from its dormancy into a period of significant coma development. Although a bow shock has not yet developed, the interactions so far involve significant deflection of the solar wind; pickup of cometary ions, charge exchange of solar-wind ions by the coma resulting in He+ and H- ions being entrained in the solar wind; the generation of low-frequency 10 – 100 mHz magnetic waves near the comet; electric-fields and waves in the range from DC up to 3.5 MHz, and significant plasma density enhancements, particularly over the neck of the comet. Also observed are negatively-charged nanograins with energies exceeding 20 keV and monoenergetic electron beams (up to 400 eV) indicative of negative charging of shaded regions of the nucleus. As the comet moves closer to the Sun these effects should increase along with the appearance of other expected effects such as a diamagnetic cavity, ionopause, and bow shock along with possibly other new and unexpected plasma and field phenomena.