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First observation of a compression-induced hot plasma injection event in Saturn's magnetosphere: A multi-instrument comparison

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During Saturn orbit insertion (SOI) Saturn's magnetosphere underwent a significant corotating interaction region (CIR) related compression. The evidence for this is manifest in the magnetic field data which confirm that a heliospheric current sheet (HCS) crossing associated with the compression region took place whilst Cassini traversed the magnetosphere. Such events have recently been suggested to produce rapid bursts of tail reconnection, and consequent auroral dynamics. Indeed, during the outbound pass of the magnetosphere, the Cassini magnetometer (MAG) data indicate a clear magnetic dipolarisation of the field structure coupled with depressions and fluctuations of the field which are indicative of hot plasma. In addition, the entry of the spacecraft into a hot plasma regime is evident in the Cassini plasma data (MIMI-LEMMS and CAPS-ELS). This magnetic and plasma signature is also correlated with a substantial enhancement and disruption of the typical Saturn Kilometric Radiation (SKR) modulation at the planetary rotation period, a signature which has recently been correlated with the pattern of CIR-related compression regions. We will discuss this data in relation to the interplanetary conditions surrounding the SOI pass, and suggest that this may be the first *in-situ* evidence of compression-related tail collapse and hot plasma acceleration at Saturn.