

OBSERVATIONAL CHALLENGES TO THE MODELING OF COSMIC RAYS BEYOND THE TERMINATION SHOCK

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The Voyager 1 spacecraft has crossed the termination shock of the solar wind, and is observing the modulation of galactic and anomalous cosmic rays (ACRs) in the heliosheath. This outer region of the heliosphere has provided several surprises and subsequent theoretical challenges as to how the ACRs is formed, accelerated and modulated, and what the modulation of galactic cosmic rays amounts to in this region. Several numerical models have been applied to this topic over the years and clear predictions have been made, thought to be based on reasonable assumptions. However, observational data indicate, for example, that the ACR source is not local to the shock region where Voyager 1 crossed into the heliosheath. The assumptions and the predictions of the mentioned models will be reviewed and compared to the observed features, with a discussion of the challenges to cosmic ray modeling.