

# Observations downstream of the heliospheric neutral atom flow at Earth and Mars

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The low energy neutral atom imagers on Mars Express and IMAGE have revealed that the neutral atom populations in interplanetary space come from a variety of sources and challenge our current understanding of heliospheric physics. For example, both in cruise phase and at Mars, the neutral particle instrument NPD on Mars Express observed “unexplained neutral beams” (e.g. Barabash, EOS Trans, AGU, 85(47), Fall Meeting Suppl., Ab. SH43A-1092, F1509-1510) unrelated to Mars which appear to be either of heliospheric or solar wind origin. Likewise, the NPI instrument on Mars Express has revealed streams of neutral hydrogen with different properties than those observed by NPD. Independently, IMAGE/LENA has reported neutral atom observations that may be interpreted as a “secondary stream” having different characteristics and flowing from a higher ecliptic longitude than the nominal upstream direction (e.g. Collier et al., Adv. Space Res., 34, 166-171, 2004; Wurz et al., AIP Conf. Proceedings 719, 195-200, 2004). Both sets of observations do not appear to fit in easily with the neutral atom environment from 1.0-1.5 AU as it is currently understood. In this presentation we examine some highly suggestive similarities in the IMAGE/LENA and Mars Express/ASPERA-3/NPI data to try to determine potential origins for the observed signal.