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Onset of 'prompt' interplanetary electrons at 1 AU and 5 AU following the October 2003 X-17 flare

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Near-relativistic interplanetary electrons ($\sim$40 keV–300 keV) from the October 2003 X-17 solar flare were measured in the interplanetary medium in the ecliptic plane at 1 AU and at 5 AU by the EPAM instrument on the ACE spacecraft and by the HI-SCALE instrument on the Ulysses spacecraft, respectively. The electron data at both locations exhibit onset anisotropies, with the anisotropies at 1 AU being much stronger than those at 5 AU. Furthermore, the onsets at 5 AU were substantially delayed from the arrival times expected from direct travel along a magnetic field line connected to the flare site. Analyses of the electron pitch angle distributions at both locations, using model distributions convolved with the detector opening angles, suggest that the half-angle width of the field-aligned electron beam at 1 AU was of the order of 20^o whereas the half-angle beam width at 5 AU was much broader, of the order of 80^o. The measurements of the angular distributions of the electrons at different energies are used to provide approximate limits on the width of the electron beam. Implications of these measurements for particle propagation in the heliosphere between the Sun and 5 AU will be presented.