

3.1.4.2 X-ray emission from electrons accelerated at CME shocks

Solar Orbiter will also make it possible to search for hard X-ray emission from electron beams accelerated at the CME shocks that produce type II radio bursts. As the density of the emission region of a type II burst is low ($<10^9 \text{ cm}^{-3}$), the related hard X-ray emission is expected to be very faint and only upper limits have been derived so far (Klein et al. 2003). In any case, the detection will only be possible in highly occulted flares. The high sensitivity of STIX down to low energies ($\sim 4 \text{ keV}$) together with the large number of partially occulted flares with type II bursts will greatly help to find an event or at least provide more stringent upper limits. Such observations would identify where along the shock electrons are accelerated, and would provide the first quantitative measurements of current unknowns, such as the spectrum and energy content of the electrons associated with radio type II bursts (e.g. Mann & Klassen 2005). Because there have never been hard X-ray observations of these shock fronts, these observations could provide decisive tests for theoretical models (e.g. Cairns et al. 2003).