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Grad Shafranov reconstruction of FTEs observed by Cluster.

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Time-varying reconnection at the Earth's magnetopause generates magnetic structures called Flux Transfer Events (FTE). When a spacecraft passes through or near to these FTEs, the typical bipolar variation in the component of the magnetic field normal to the magnetopause is observed. Various generation mechanisms have been proposed: the original Russell and Elphic FTE model (1978) predicts a pair of elbow shaped flux tubes of reconnected field lines generated by intermitted and localized reconnection. Alternatively, Lee and Fu (1985) propose that FTEs are caused by reconnection along multiple extended X-lines while a third FTE model is based on bursty reconnection along a single X-line (Scholer et al. 1988; Southwood et al., 1988).
Detailed analysis of these magnetic structures can give information about their generation mechanism, since both the orientation and the internal field topology differ among the three FTE models.
Here we use the Grad Shafranov reconstruction technique to study a number of FTEs consecutively observed by Cluster spacecraft, during the dayside magnetopause crossing on 27 March 2007. The optimization procedure illustrated by Hu and Sonnerup (2002) is adopted to determine the orientation of these FTEs. The characteristics of these magnetic structures have been analyzed and discussed in the framework of the main FTE models cited above.