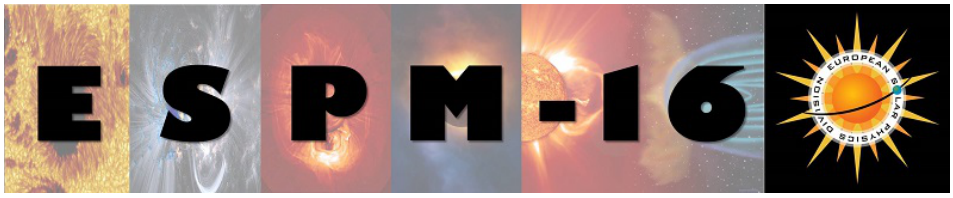

Contribution ID: **344** Type: **Poster**

Thermal modelling of the middle solar corona

Wednesday, 8 September 2021 16:43 (13 minutes)

Since the discovery of the solar corona, many attempts have been made to model its behaviour. Perhaps the most well-known attempt was made by Parker (1958) when he assumed that the quiet sun corona is in hydrodynamical balance. Nevertheless, his model has several limitations (a saddle point, non-diverging solutions, etc). Lemaire & Stegen (2016) introduced the DYN model that addressed those issues by assuming a more realistic electron density distribution and boundary conditions based on in-situ observations at 1 AU.

More recently, Lemaire & Katsiyannis (2021) expanded further on the DYN model and produced electron temperature profiles, $T_e(r)$, for a variety of observed conditions. They found a very large increase in $T_e(r)$ at radial distances of ~2-5 solar radii and conjectured that a heating process takes place at those levels.

This contribution will present the DYN model, with its assumptions and limitations. It will also contain the most important results published by Lemaire & Stegen (2016), and Lemaire & Katsiyannis (2021), including temperature profiles for a variety of commonly observed conditions. A comparison between the $T_e(r)$ predictions of the model and recent observations will also be included. Finally, there will be a discussion about future work and the reduction of the number of assumptions.

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Session Classification: Poster Session 8.4

Track Classification: Session 3 - Fundamental Plasma Processes in the Solar Atmosphere: Magnetic Reconnection, Waves, Emission, Particle Acceleration