

Abstract Submitted
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Uncombed Penumbrae: Formation, Ongoing Reconnections and Fine Substructures MARGARITA RYUTOVA, LLNL/IGPP — Sunspot penumbrae consist of an “uncombed” system of thin, interlaced magnetic flux tubes with varying physical parameters and inclinations. Recent high-resolution observations from space and ground based instruments reveal previously unobservable details in structure and dynamics of penumbra. Based on these observation we propose a mechanism that explains the fine structures of penumbra filaments, their dynamics and their formation process. The mechanism is based on the fact that the umbra itself is a dense conglomerate of twisted, interlaced flux tubes with peripheral filaments branching out from the “trunk” at different heights due to ongoing reconnection processes. The twist of individual filaments, and resulting distribution of magnetic fields and temperature forming sub-structure of filaments, is due to the onset of the post-reconnection screw pinch instability, the parameters and details of which are well observed and can be measured from our data.

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