MONTANA STATE UNIVERSITY

Physics Colloquium

Friday February 5th, 2010
4:10 – 5:00 pm, 108 EPS

"Hinode and the Rosetta Stone of the Solar Corona"

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Abstract:
I will present and discuss observations from the JAXA/NASA Hinode spacecraft that have recently uncovered the signature of dynamic chromospheric phenomena in the corona. We use a novel analysis technique to quantify the asymmetry of EUV spectral lines observed with Hinode/EIS and demonstrate that the sites of the faint, but rapidly rising material at several million degrees, are co-spatial with, and have the same velocity distribution as, a type of upper chromospheric jets, or spicules, found by Hinode/SOT. The techniques presented offer a means to reliably "translate" the line emission spectra throughout the upper solar atmosphere in terms of the relentless, dynamic mass transfer between the chromosphere and corona.
Subsequent investigations have identified these jets in imaging datasets of the EUV and SXR corona. We see that order of magnitude estimates indicate that this previously undetected mass transfer should play a significant role in filling the outer atmosphere with hot plasma. As such, these observations challenge the long-standing coronal heating paradigm by demonstrating that the bulk of the energy responsible for the heating of coronal plasma is not deposited at coronal heights, but in the chromosphere in association with dynamic jets driven from below."

Host:
David McKenzie