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Heat Flux Driven Instabilities in Magnetized Temperature Filaments-UCLA MEIXUAN SHI, GEORGE MORALES, JAMES MAGGS, DAVID PACE, UCLA — An analytical and computational study is made of low-frequency instabilities driven by parallel electron heat flux in a temperature filament whose length along the magnetic field is much larger than its transverse dimension. This is a situation encountered in magnetic and inertial fusion, ionospheric HF heating and at the surface of the sun. A linearized eigenvalue problem is formulated for magnetized ion acoustic modes that are evanescent outside the filament. Specific numerical results are obtained by coupling the stability analysis to a two-dimensional classical transport code. The code is used to deduce the spatial dependence of the perturbed electron distribution function associated with the heat flux. Certain criteria for the existence of the instability are found to interpret measurements of low-frequency fluctuations that develop spontaneously in controlled electron temperature filaments generated in the LAPD-U device.

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