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Investigating the chromosphere above sunspot umbrae with an acoustic resonator

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Abstract :

Above a sunspot umbra the chromosphere resonates with three-minute oscillations. These oscillations can be explained as an acoustic resonator with slow magnetosonic waves moving along magnetic field lines and are partially reflected at the solar photosphere and transition region. The temperature structure of the chromosphere is explored by perturbing the plasma with random noise. Spectra of the velocity fluctuations show that as the chromospheric depth increases, the gradient of the power in the spectra decreases. This relation is explored with white, pink and brown noise seeds as well as different temperature profile configurations. It was found that a clear signature in the obtained spectra can be used as a potential measure for the chromospheric depth above sunspots.

Award :

No

Level :

PhD

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Paper :

No

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