

# Shock Excitation Evidence in the [S II] Spectrum

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The spectral lines, such as those of [O II], [O III] and [S II], would provide us with electron density and temperature information, in planetary nebulae. We analyzed these diagnostic spectral line profiles, secured with the Keck I 10-m optical telescope and HIRES spectrograph. From careful reduction procedures, we produced false color maps of velocity dispersion vs. spatial component (long slit direction,  $\sim 0.8''$  resolution), e.g. in the spectra of the well-known planetary nebula NGC 7009 to identify the shock emission features in the line profiles: the [S II] velocity dispersion maps strongly indicated these lines were perhaps due to shock heating; and the [O III] velocity dispersion also showed a velocity field, similar to that of the [S II] result, while those of [O II] did not show such evidence. The [S II] emission regions might be located at the shock boundary, consisting of numerous small-scale blobs of about 1 arcsecond, while the [O II] might be located a region, far from the above shock boundaries. We present the various Keck I HIRES maps.