

Molecular and Ionic shocks in the Supernova Remnant 3C 391

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We present new observations of the supernova remnant 3C391 in the near-infrared, using the H₂ 2.12 μm and [Fe II] 1.64 μm narrow-band filters in the Prime Focus Infrared Camera on the Palomar Observatory Hale 200" telescope, and in the mid-infrared, using the circular-variable filters in the ISOCAM on the Infrared Space Observatory. The shocked H₂ emission is largely confined to the region 3C391:BML (40" size), where broad millimeter CO and CS lines had previously been detected. The [Fe II] emission has a significantly different distribution, being brightest in the radio bar and tracing the radio shell. The mid-infrared spectrum reveals bright ionic lines of [Fe II] 5.5 μm , [Ar II] 6.9 μm , [Ne II] 12.8 μm , and [Ne III] 15.5 μm . There are no aromatic hydrocarbons associated with the shocks, nor is there any mid-infrared continuum, suggesting that macromolecules and very small grains are destroyed in the shocks. The broad-molecular line region 3C391:BML was detected in 5 rotational H₂ lines and was imaged at 1.5" resolution in the near-infrared H₂ line. The molecular shocked region resolves into 15 clumps of H₂ emission, with no embedded continuum sources. We interpret these clumps as a cluster of pre-stellar cores that are presently being shocked by the supernova blast wave.