

N91-15028
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CIRCUMSTELLAR GRAIN EXTINCTION PROPERTIES OF RECENTLY DISCOVERED POST AGB STARS

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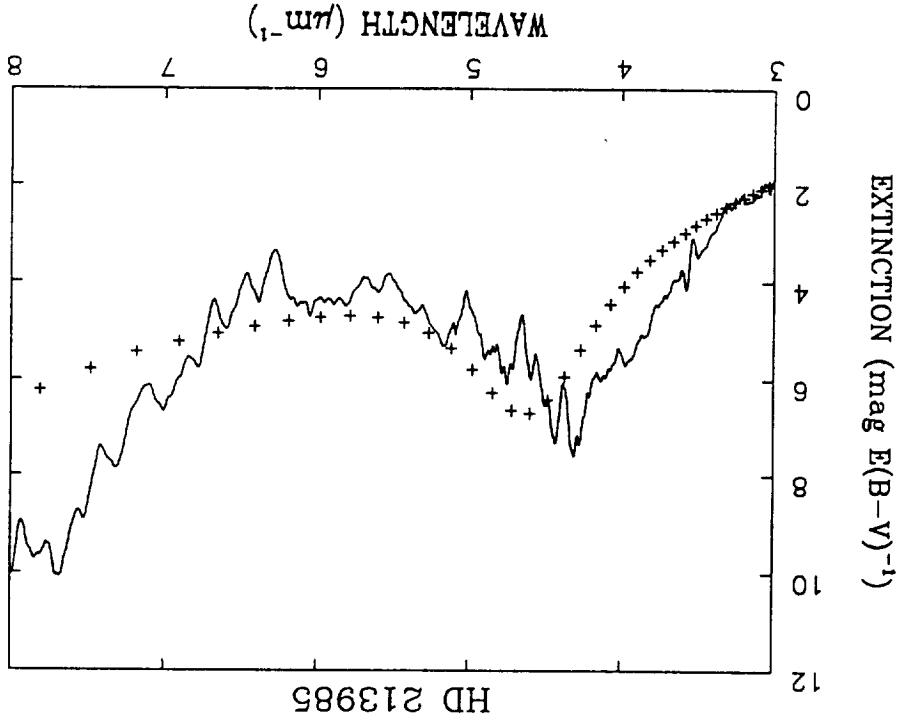
We have examined the circumstellar grains of two hot evolved post asymptotic giant branch (post AGB) stars, HD 89353 and HD 213985. Other studies have detected 3.3, 3.53, 7-9, and 11.3 μm infrared emission features toward HD 89353 but have found no 3 μm infrared emission lines toward HD 213985. From ultraviolet spectra, energy balance of the flux, and Kurucz models, we derived the extinction around 2175 \AA . With visual spectra, we attempted to detect 6614 \AA diffuse band absorption arising from the circumstellar grains so that we could examine the relationship of these features to the infrared features. For both stars, we did not detect any diffuse band absorption at 6614 \AA , implying that the carrier of this diffuse band is not the carrier of the unidentified infrared features nor of the 2175 \AA bump.

We found that the linear ultraviolet extinction of the carbon-rich star HD 89353 continued across the 2175 \AA region with no sign of the bump; for HD 213985 we found the reverse: a strong, wide bump in the mid-ultraviolet. We ascertained that the 213985 bump was positioned at 2340 \AA , longward of its usual position in the interstellar medium. Since we determined that HD 213985 had excess carbon, the bump probably arises from a carbonaceous grain. Thus, in view of the ultraviolet and infrared properties of the two post AGB stars, ubiquitous interstellar infrared emission features do not seem to be associated with the 2175 \AA bump. Instead, the infrared features seem related to the linear ultraviolet extinction component: Hydrocarbon grains of radius $< 300 \text{\AA}$ are present with the linear HD 89353 extinction; amorphous anhydrous carbonaceous grains of radius $< 50 \text{\AA}$ might cause the shifted ultraviolet extinction bump of HD 213985.

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• Figure 2 - Ultraviolet circumstellar extinction normalized to the mean interstellar extinction at $3.3 \mu\text{m}^{-1}$. HD 213985 has a shifted mid ultraviolet bump and a greater far ultraviolet rise than the interstellar medium (crosses).



• Figure 1 - Carbonaceous protoplanetary nebula ultraviolet circumstellar extinction. HD 89353 is linear throughout; data unreliable beyond $6.7 \mu\text{m}$. Spectral extinction has been normalized to the mean interstellar curve (crosses) at about $3.3 \mu\text{m}^{-1}$.

