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Destruction and Survival of PAHS in Astrophysics: From Low-Metallicity Galaxies to Elliptical Galaxies and Galactic Halos

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The 3.3, 6.2, 7.7, 8.6 and 11.3 micron emission features of polycyclic aromatic hydrocarbon (PAH) molecules have been seen in a wide variety of Galactic and extragalactic objects. However, the PAH features are weak or absent in low-metallicity galaxies and AGN. On the other hand, they have recently been detected in elliptical galaxies, tidal dwarf galaxies, galaxy halos, and distant galaxies at redshift >2. In this talk, I will review the photophysics of PAHs and discuss the deficiency or lack of PAHs in AGNand low-metallicity galaxies in terms of photodestruction, as well as the survivability of PAHs in elliptical galaxies and galaxy halos where they are expected to be easily destroyed through sputtering by hot plasma ions.