Spitzer Colors of Everything* in the Universe:
a Field Guide for the Perplexed

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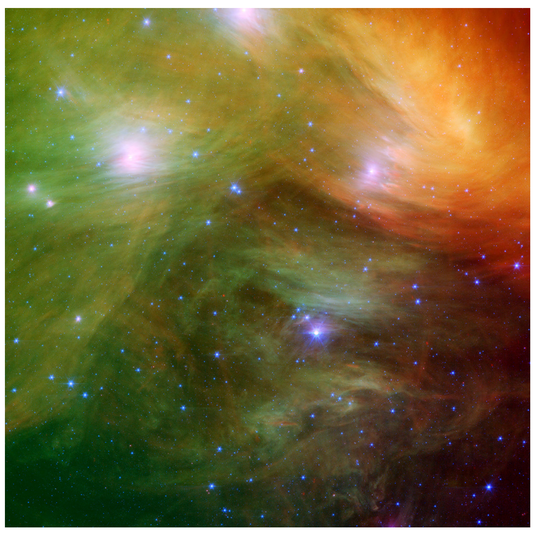
Spitzer has produced a wealth of imaging data[1] on everything from Galactic white dwarfs to high-redshift galaxies. Relative flux densities in two different bands, or colors, can provide a quick-and-easy way to discriminate between different classes of objects. However, different observers use different conventions and units for plotting colors. Here I combine *Spitzer* colors from many different sources and plot them in a consistent way, providing a field guide to color-color space.

[1] And of course spectroscopic data, which are not discussed here.



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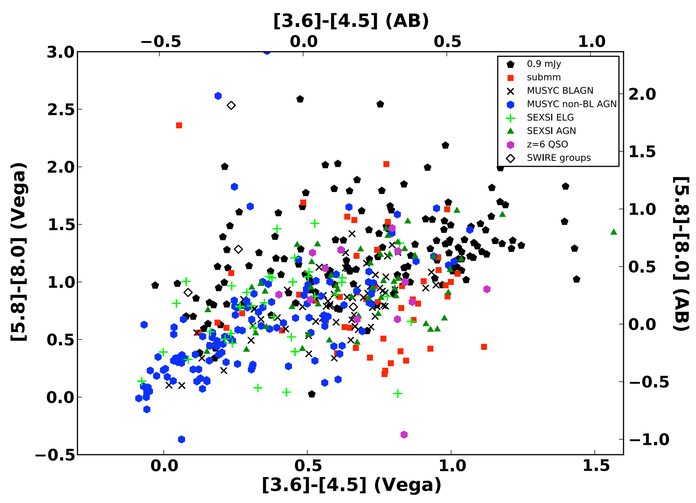
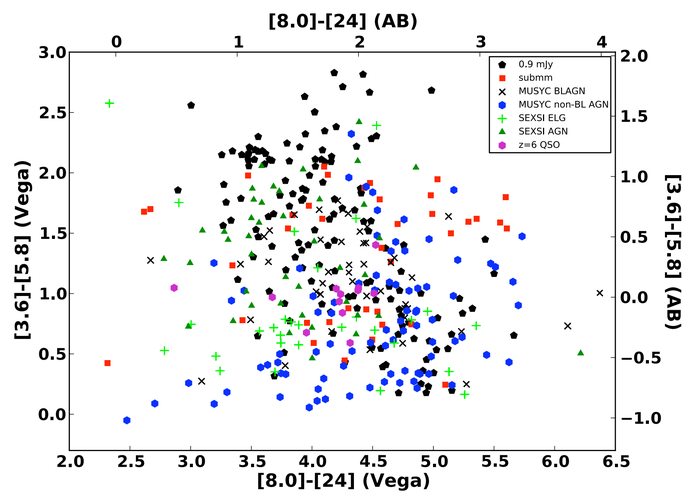
The general idea: I collected IRAC and MIPS photometry from published papers, using datasets for which position in Spitzer color-color space was not the primary classification criterion (for a good example of using Spitzer color classifications, see Gruendl & Chu 2009). The intent was to represent as many different object types as possible, but not to collect every possible data point. With some Python code that knows how to convert between AB magnitudes, Vega magnitudes, and flux densities in micro/milli/Janskys, I started plotting.

*Well, nearly everything: I didn't find any Spitzer observations of pulsars, for example. Suggestions for additions are welcome!



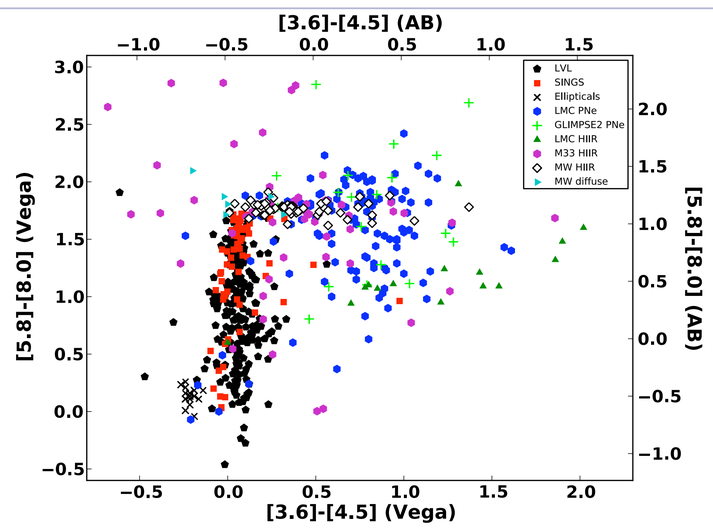
High-redshift Galaxies and AGN

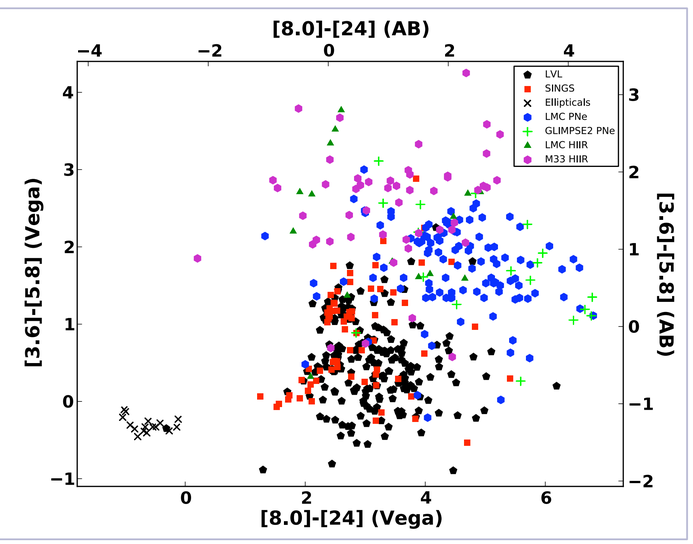
0.9 mJy (24 micron-selected): Dasyra et al. 2009, sub-mm galaxies (Hainline et al. 2009), MUSYC broad-line and non-broad-line AGN (Cardamone et al. 2008), SEXSI AGN and emission-line galaxies (Eckart et al. 2010), *z=6* QSOs (Jiang et al. 2006), SWIRE galaxy groupings (Davoodi et al. 2006).

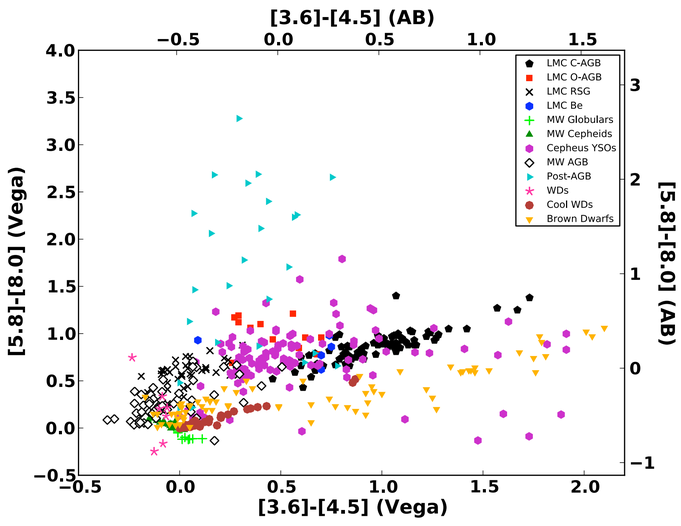


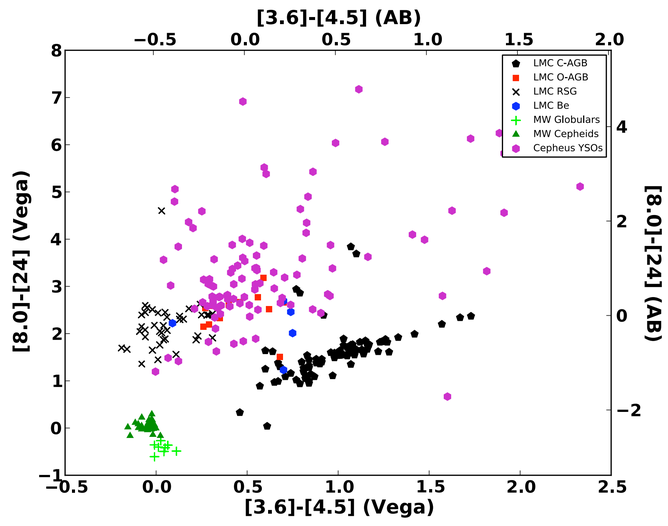
Low-redshift Galaxies & Other Fuzzies

Galaxies in the Local Volume Legacy Survey (Dale et al. 2009), SINGS survey (Muñoz-Mateos et al. 2009), nearby ellipticals (Temi et al. 2008); planetary nebulae in the LMC (Hora et al. 2008) and the Milky Way (Zhang & Kwok 2009); HII regions in the LMC (Kastner et al. 2008), M33 (Verley et al. 2007), and the Milky Way (Phillips & Ramos-Larios 2008); diffuse emission in the Milky Way (Flagey et al. 2006).





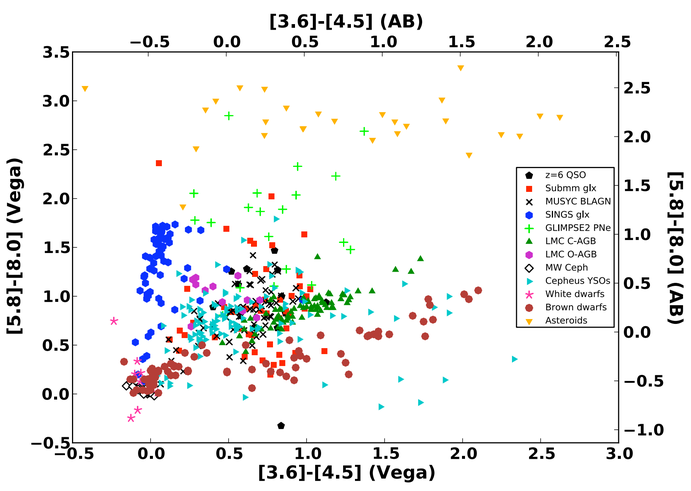


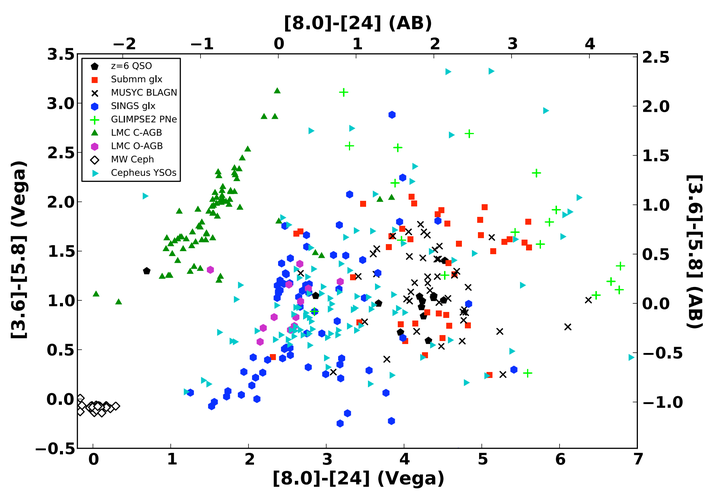


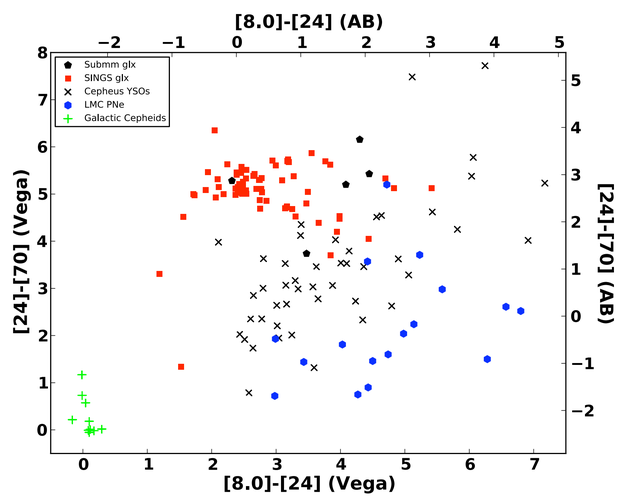
Stars & Young Stellar Objects

LMC carbon-rich and oxygen-rich asymptotic giant branch, red super giants, and Be stars (Kastner et al. 2008); Milky Way globular clusters (Barmby et al. 2009), Cepheids (Marengo et al. 2010), YSOs in the Cepheus Flare (Kirk et al. 2009), AGB stars (Marengo et al. 2008), post-AGB stars (Cerrigone et al. 2009), white dwarfs (Farihi et al. 2008), cool white dwarfs (Kilic et al. 2009), and brown dwarfs (Leggett et al. 2010).

Everything in the Universe: Selected categories of objects shown above, plus asteroids (Ryan et al. 2009).







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