The variation of the dust attenuation curve in the nearby Universe

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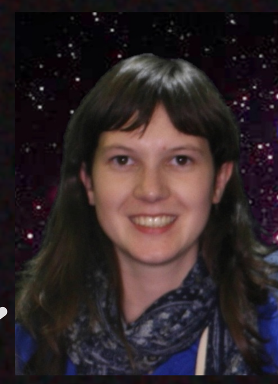

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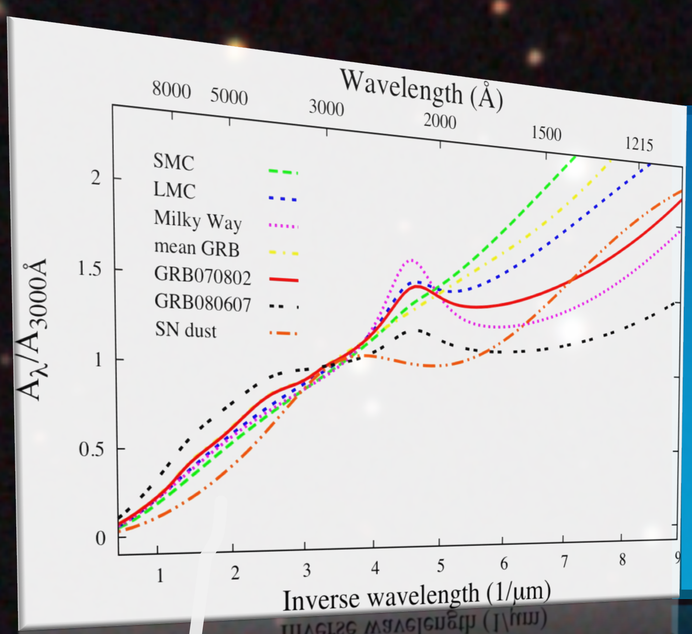
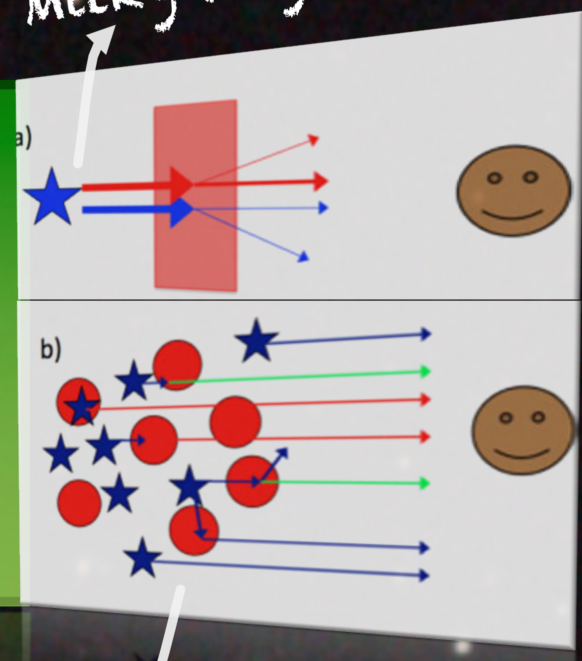
Interstellar dust absorbs and scatters nearly half of the starlight in the Universe, heavily influencing our view on galaxies. Furthermore, it plays a crucial role in several astrophysical processes. A full understanding of the dust properties and the interplay between dust and starlight is essential to recover the stellar light obscured by dust, and to determine the energy balance between gas heating and cooling processes. It is hence fundamental to probe the current and past star formation activity and to constrain the cosmic star formation history.

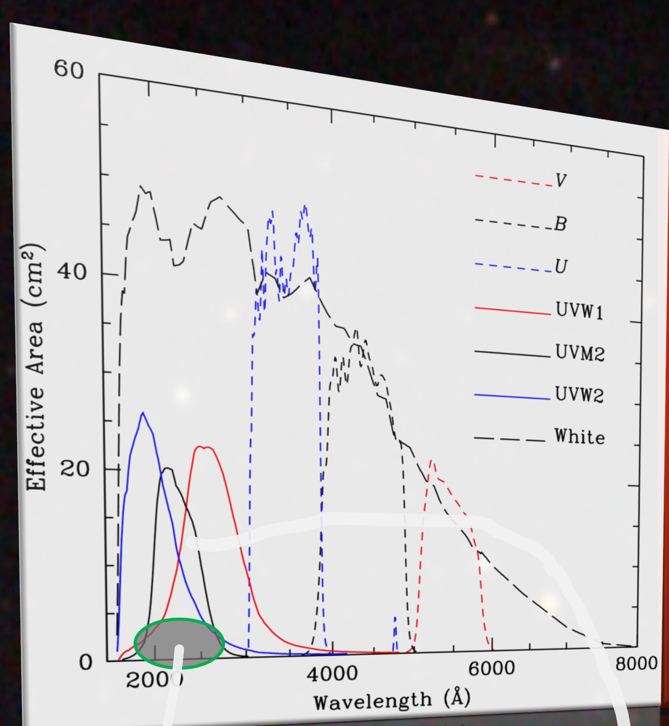


In extragalactic studies, the **dust attenuation law** is usually assumed to be similar to the Milky Way for normal galaxies, while the Calzetti relation is used for starbursting galaxies. However, there is growing evidence for strong deviations from a universal dust attenuation law.

For the Milky Way and the Magellanic clouds, we can determine a dust extinction curve, independent of the geometry (a). For other galaxies, however, this is not possible. Since we see a mixture of stars and dust in the same beam, **geometry effects** play an important role in shaping the dust attenuation curve (b).

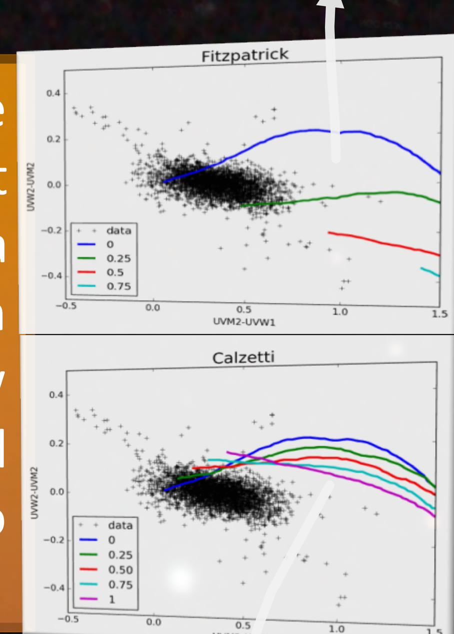


We have initiated an ambitious program, **DustKing** to study the variation of the dust attenuation curve and the dust properties in the nearby Universe. It is based on the **SINGS/KINGFISH sample**, a unique local galaxy sample spanning a wide range of morphological galaxy types, metal abundances and star formation activities. We are gathering multi-wavelength imaging data for this sample, covering the UV to the submillimeter wavelength range. Particularly important for our goal are UV data, which we are gathering from the GALEX and **SWIFT** missions.



The three **SWIFT UVOT** bands cover the **2175 Å dust absorption feature** that is thought to originate from carbonaceous dust grains. The variety in strength and width of the bump in the dust extinction curve observed among different galaxies provides a clear indication for the diversity in dust grain composition and size distribution in the local Universe.

This **SWIFT UVOT color-color plot** is the first result for the galaxy **NGC 628**. At first sight, it is hard to say whether the data points agree with a Milky Way extinction curve (top panel) or a starburst Calzetti law (bottom panel). We will require detailed stellar population synthesis modelling to constrain the dust properties in this galaxy.



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