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Testing surface-brightness–colour relations as a dust attenuation proxy with LSST, JWST and HST

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A reliable dust attenuation estimate can be obtained from spectral energy distributions (SEDs) constructed over a wide range of wavelengths, including the ultraviolet (UV) and infrared (IR) regions. It is necessary to account for dust attenuation in order to reliably extract galaxy properties, such as the star formation rate (SFR), stellar ages and evolutionary state. The Legacy Survey of Space and Time (LSST) will provide optical observations of billions of objects. This creates a need for a dust attenuation proxy that uses optical data only. There have been proposals for such methods, but they still require verification from independent tracers. This requires comparing the attenuation estimated from optical data alone with a reference attenuation estimate derived from broad-wavelength SED fitting, including UV and IR data from auxiliary surveys. In this study, we investigate whether surface brightness and colour can predict dust attenuation. In our analysis, we combine observations from the James Webb Space Telescope and Hubble Space Telescope with LSST observations in the overlapping fields, such as GOODS-South and COSMOS-Web, restricting the sample to (z \sim 0.3).

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