

A vibrant, multi-colored nebula with stars, serving as a background for the text. The nebula features a mix of red, orange, yellow, and purple hues, with numerous bright stars scattered throughout. The text is centered over the image.

Interstellar Extinction

Stellar Distances

1 Distance to the stars

There are basically **two methods** to measure the distance D to a star

- **Trigonometry**

Measuring position changes of a star due to different viewing angles

Limited to near-by stars

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Stars in other galaxies can be reached

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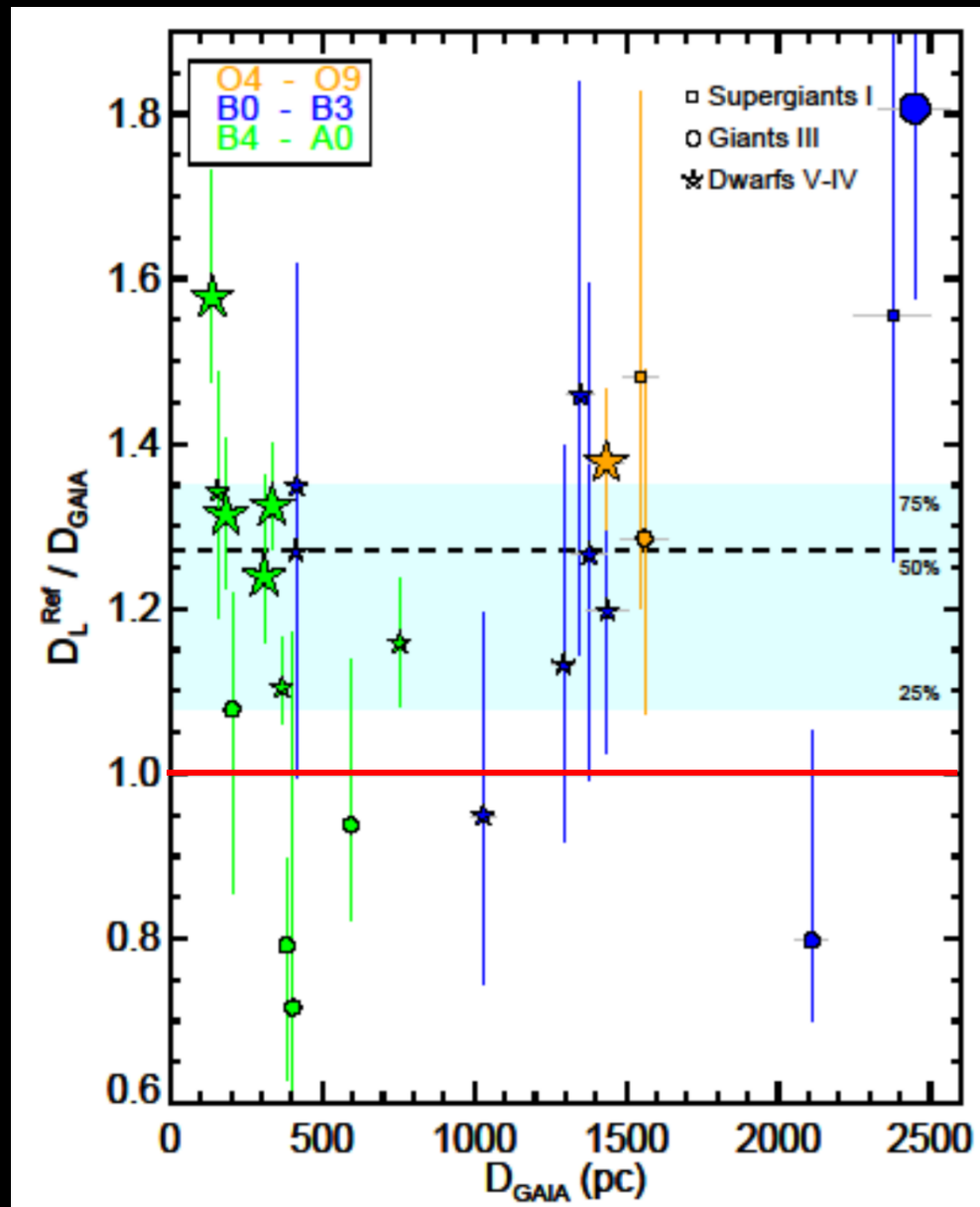
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The determination of the dust extinction A is required

2 Distance discrepancy

A distance comparison for 24 well-known stars with distances from GAIA astrometry D_{GAIA} and from high-precision photometry D_L shows a systematic discrepancy



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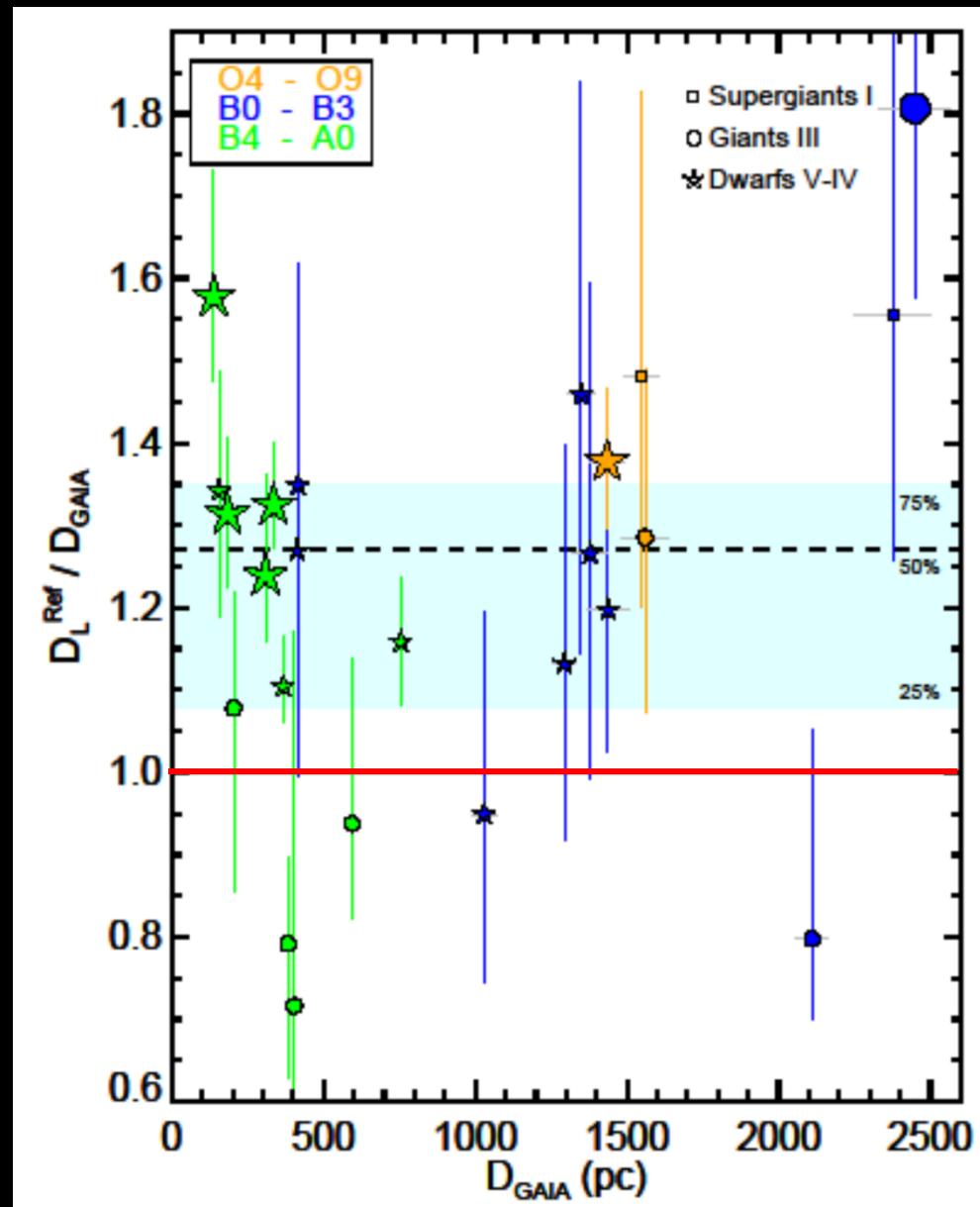
A distance comparison for 24 well-known stars with distances from GAIA astrometry D_{GAIA} and from high-precision photometry D_L shows a systematic discrepancy

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There are no stars with a distance ratio below 1.25 detected at 3σ confidence.

The distances ratios are $0.7 \leq D_L/D_{\text{GAIA}} \leq 1.8$

Correcting the distance discrepancy is not feasible through arbitrary adjustments to commonly used literature values in M



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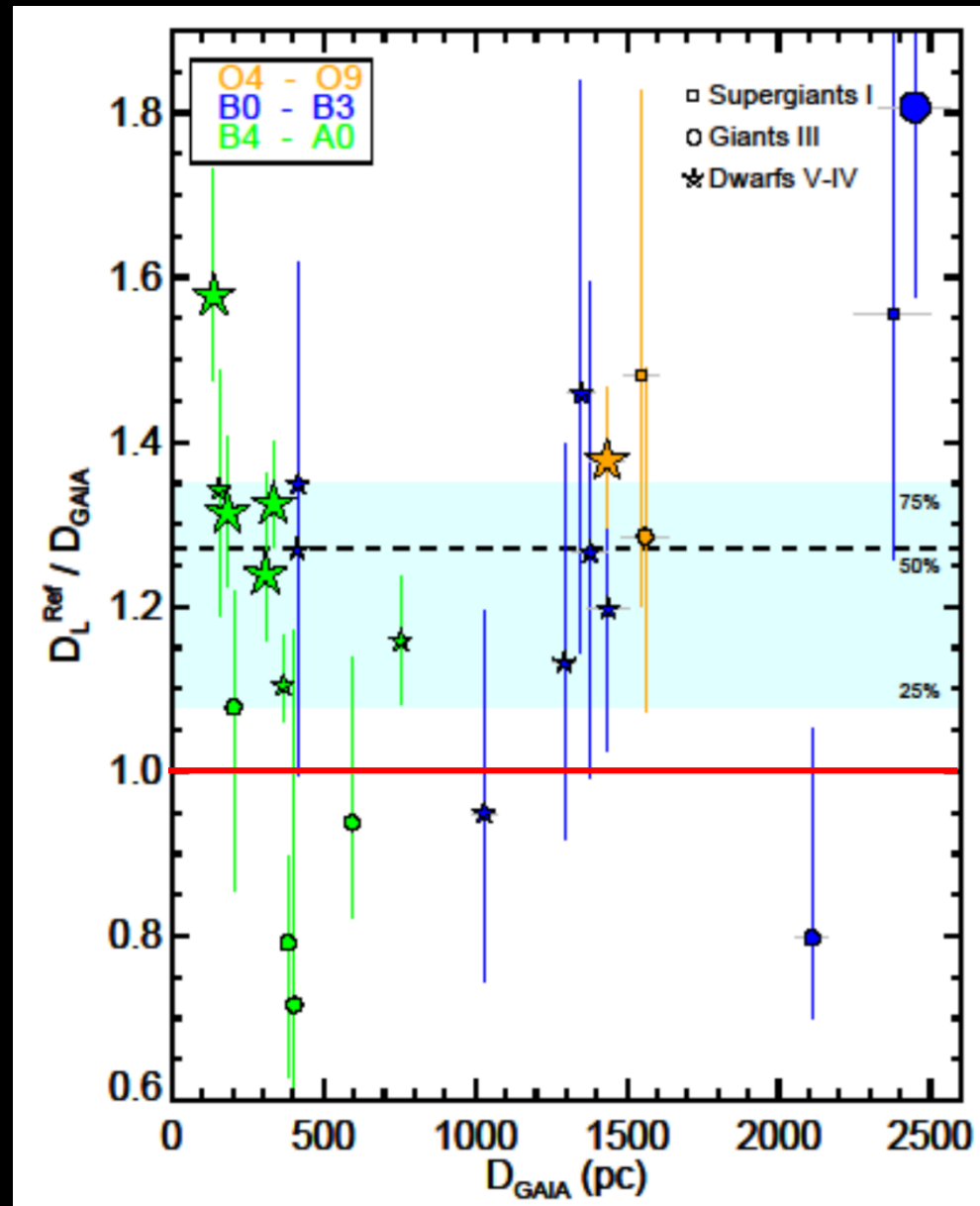
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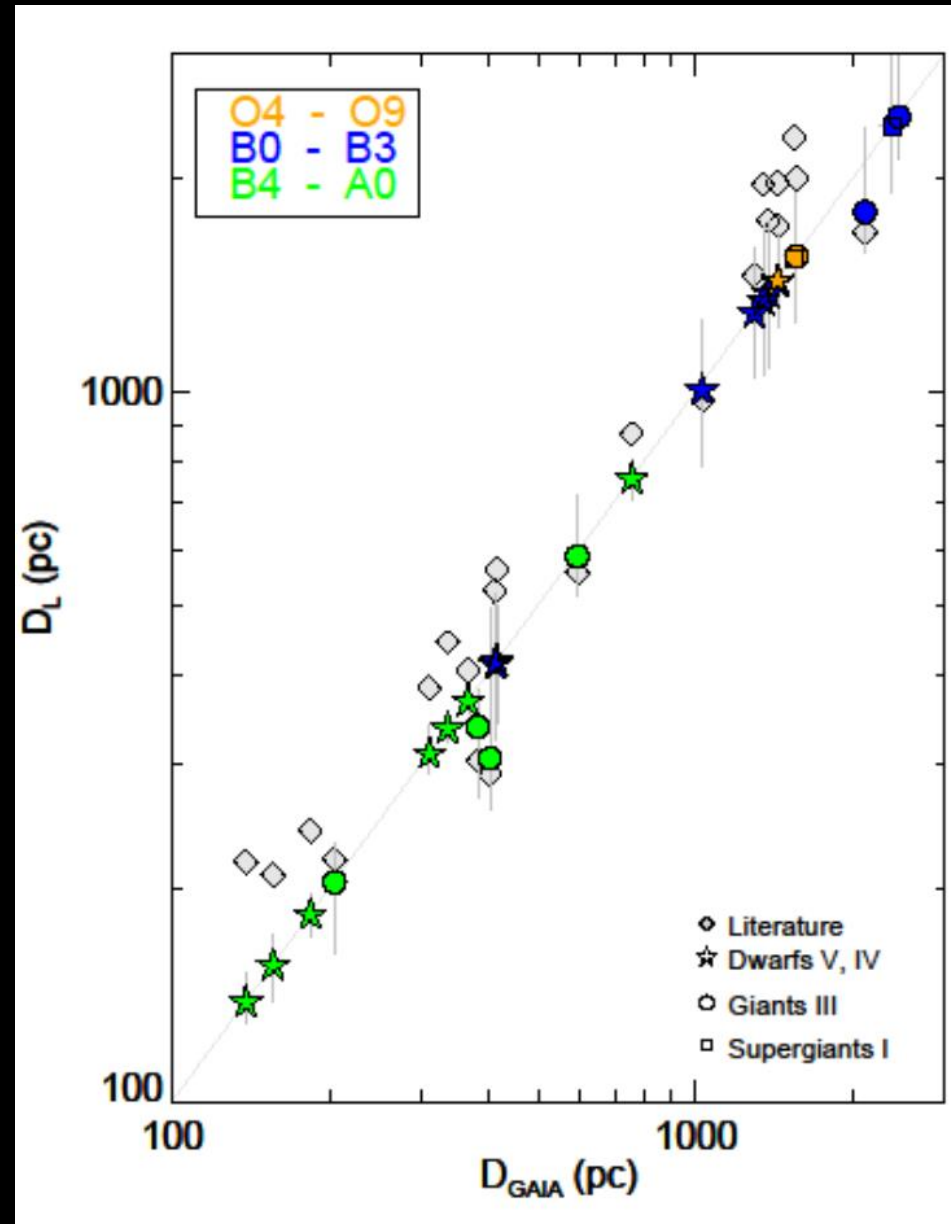
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In 80% of the cases there is an overprediction of the luminosity distance D_L

3 Dark Dust

Our dust models can resolve the discrepancy by adding a population of micron-sized grains



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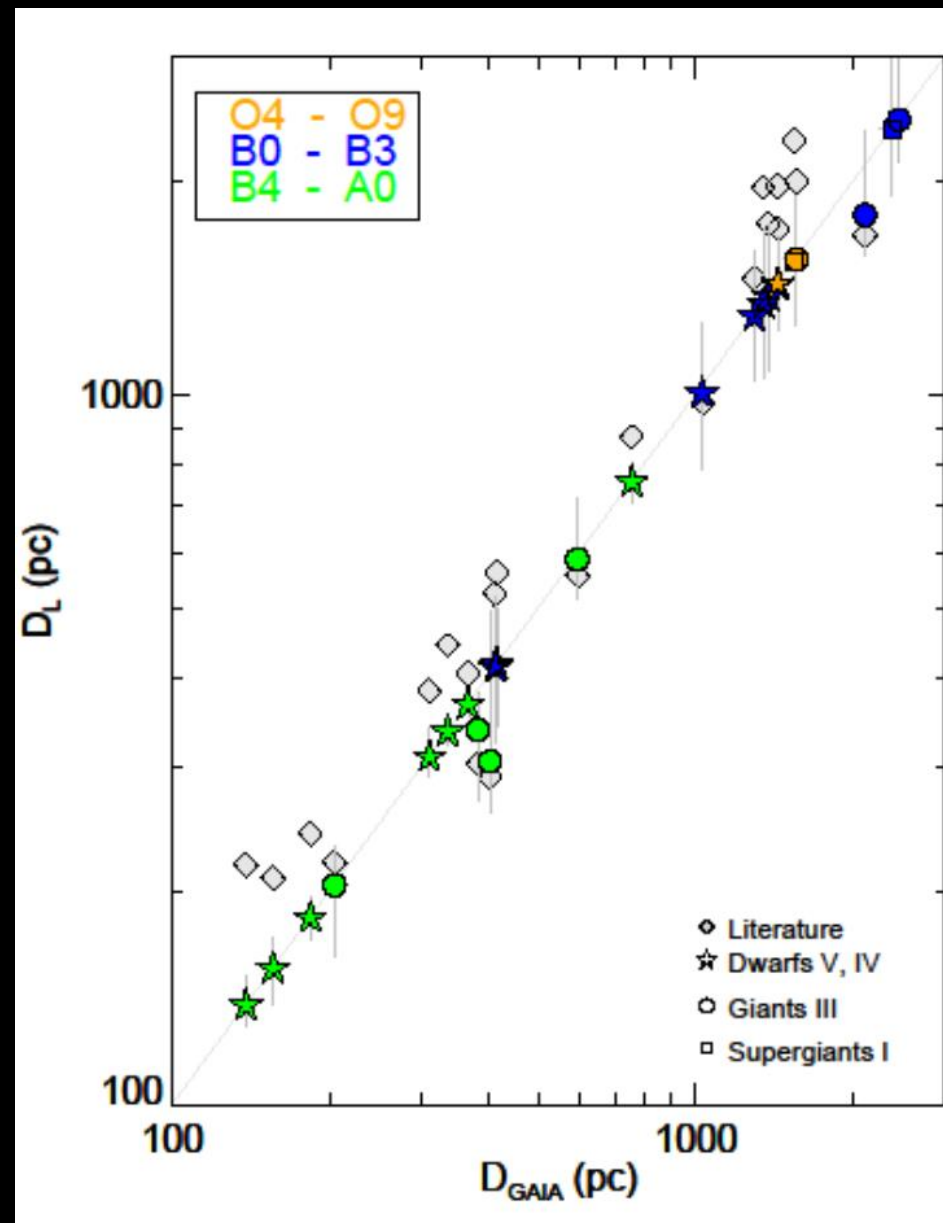
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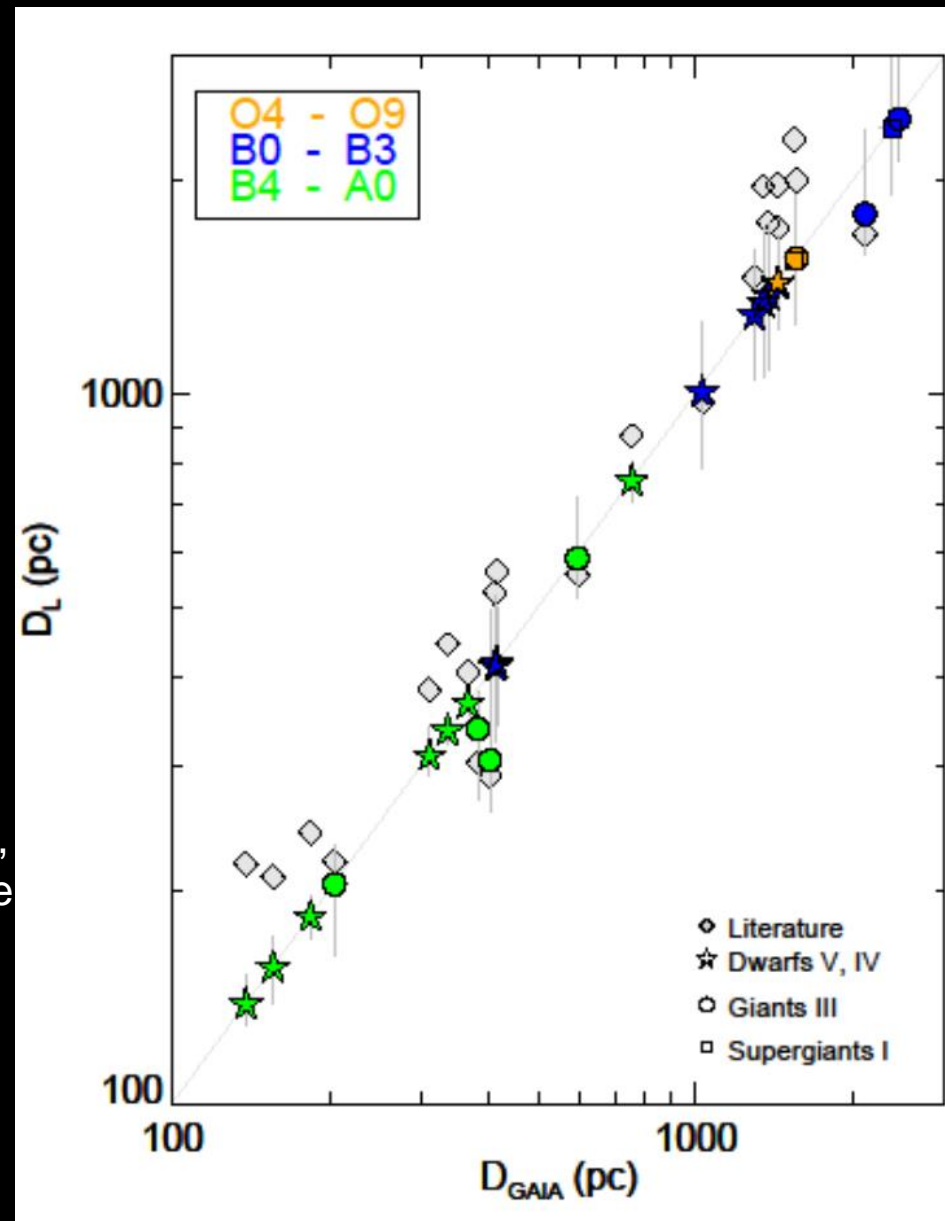
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➔ Dark Dust

- Consequences

Distance indicators like Cepheids, RR Lyrae stars, and eclipsing binaries might suffer from inaccurate extinction correction

A **Dark Dust** component in the vicinity of SN Ia progenitors will contribute to the broadening of SN Ia light curves



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➡ Implications for the quantity of **Dark Energy**

