

The background consists of several thick, light blue wavy lines on a white surface. These lines are irregular and overlap each other, creating a sense of motion and depth. They are positioned at various angles and heights across the frame.

Anton Melnychuk

Part 1

$$\textcircled{1} \quad B\text{-filter: } 19.5 - 22.7 = -3.2 \text{ mag.}$$

$$R\text{-filter: } 19.9 - 20.9 = -1 \text{ mag.}$$

The difference in B and R filters is due to the different length of light those filters are sensitive to. Also, blue light is scattered more by the Earth atmosphere, so brightness captured by B is > R.

$$\textcircled{2} \quad D = 1 \text{ m} \quad N = 100 \quad T = 10 \text{ s.} \quad \lambda = 400 \text{ nm.} = 400 \cdot 10^{-9} \text{ m.}$$

$$d = 100 \pm 3 \text{ pc.}$$

Luminosity:

$$\text{Flux} = 100/10 = 10, \Rightarrow F_{\text{flux}} = \frac{L \lambda}{4\pi d^2}.$$

$$\Rightarrow L = 4\pi d^2 F / \lambda$$

$$\Rightarrow L = \frac{(4\pi \times (3.086 \cdot 10^{15} \cdot 100)^2 \cdot 10)}{400 \cdot 10^{-9}}$$

$$= \frac{4\pi \cdot 3.086^2 \cdot 10^{54}}{4 \cdot 10^{-9}} = 4\pi \cdot 3.086^2 \cdot 10^{44}$$

$$\Rightarrow L \approx 2.992 \cdot 10^{45} \pm 9.5041 \cdot 10^{44} \text{ Watts}$$

Uncertainties:

$$\left(\frac{\Delta_L}{L} \right)^2 = \left(\frac{\Delta_d}{d} \right)^2 + \left(\frac{\Delta_F}{F} \right)^2 + \left(\frac{\Delta_\lambda}{\lambda} \right)^2 =$$

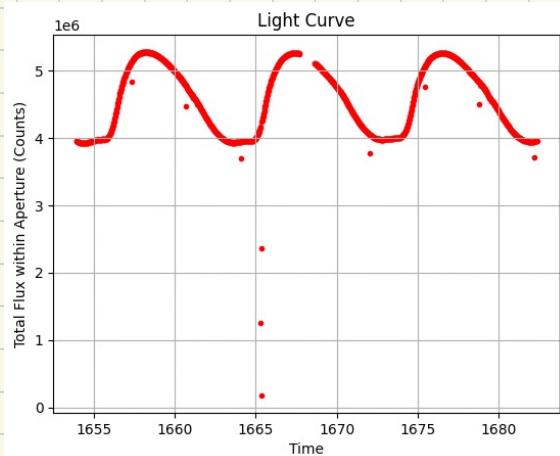
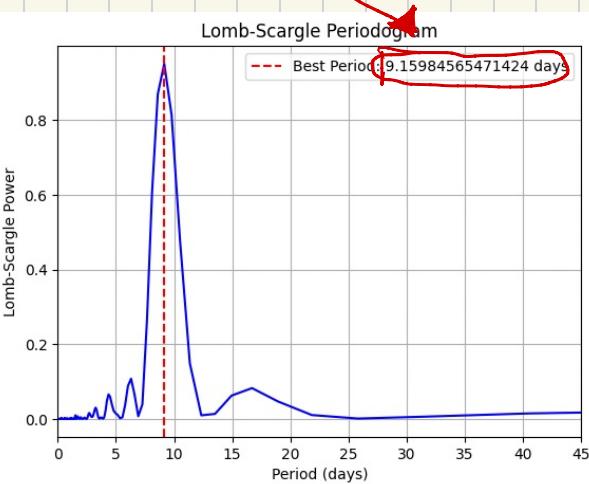
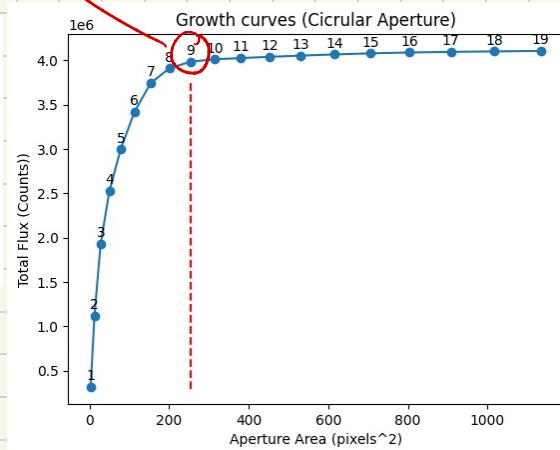
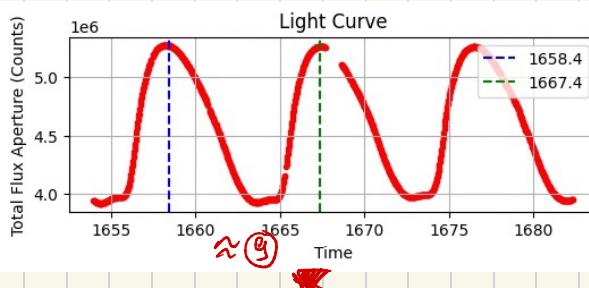
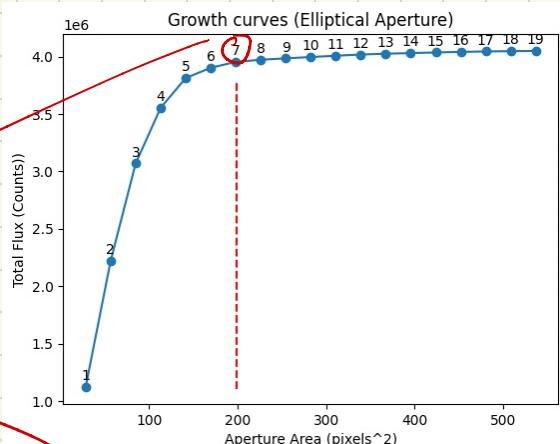
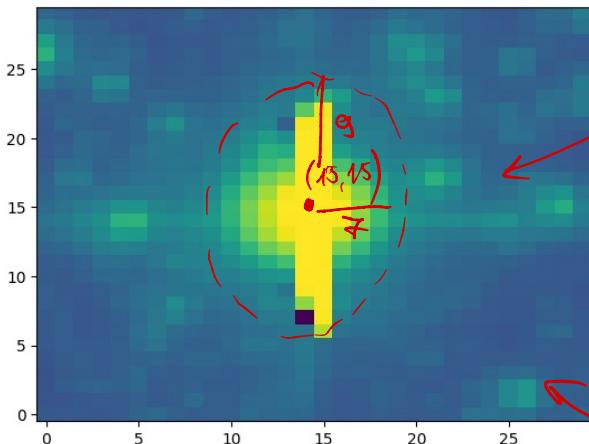
$$= \left(\frac{3.086 \cdot 10^{15} \cdot 3}{3.086 \cdot 10^{15} \cdot 100} \right)^2 + \left(\frac{10}{10} \right)^2 + \left(0 \right)^2 = 0.1009. \Rightarrow \frac{\Delta_L}{L} \approx 0.31765$$

we've already given mean of redshift photons

the source is monochromatic.

about 30%

Part #2



Part *3

(1) How many orbits are requested and what instrument/filter?

The proposal requested 36 orbits in total using ACS (Advanced Camera for Surveys) instrument in ACS/WF3 imaging mode with F606W and F814W filters. (3 gyroscopes)

However, they also have a second option of for 40 orbits in case 3 gyroscope observations will be rejected. (Then, they want use 2 instead.)

(2) What science is being proposed? How will the data requested enable the proposed science?

This allocation comprise 18 orbits each for NGC-0185 and NGC-0147, the only two Local Group dwarf elliptical (dE) galaxies we are able observe so far.

They aim to determine the forming history of dE galaxies by directly measuring their stellar population as the only way to get the ratio $b_{\text{tot}}/\text{old}$ to intermediate age populations expected in these galaxies.

The requested ACS imaging, 3 mag. fainter than the previous observations, enables the observation of stars near the main-sequence turnoff, essential for understanding the stellar populations.