

## Activity 2: The Period-Luminosity Relation

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In this activity, we will collaboratively measure the distance to the galaxy M100 (NGC 4321) using known Cepheid variables that *you* will have to find, along with the period-luminosity relation described by Henrietta Lewit in 1912.

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### Instructions

Using your computer and/or your cellphone, go to the following website: <http://astro.wku.edu/labs/m100/thehunt.html> (this website has been put up by Diane Dutkevitch and the The Northwestern University Astronomy Web Lab Series). With this at hand, follow the following instructions:

1. Choose one of the grids in the webpage, and search for its Cepheid variable. Once you find it, write down the period of the variable and its *apparent magnitude*,  $m_v$ .
2. Use the Leavitt's period-luminosity relation to find the *absolute magnitude*,  $M_V$ , of the star. The relation is  $M_V = -[2.76(\log_{10} P - 1.0)] - 4.16$ .
3. Go and write in the whiteboard the distance modulus,  $D = m_V - M_V$ .
4. Using the distance modulus from all of your classmates, compute the distance to M100 by using the formulae  $d = 10^{0.2(\bar{D}+5-A_V)}$ , where  $A_V = 0.25$  and  $\bar{D}$  is the average distance modulus obtained for all the Cepheids.