



M2 : Characterization of Kilonovae seen by Vera

antier@ijclab.in2p3.fr pillas@iap.fr

Time Domain Astronomy is a research field that covers explosive phenomena such as the collapse of massive stars or the collision of compact objects involving a neutron star or a black hole. These events can be detected through the light emitted by the ejected matter across the full electromagnetic spectrum, which travels at very high speed. This optical light signature typically reaches its peak brightness within a few hours and declines rapidly to several days, but it highly depends on the type of event. Among them, kilonovae are optical radioactive signatures of heavy elements freshly synthesized in a neutron-rich environment after, for instance, a binary neutron star merger. In this internship, we will focus on characterizing the ejected material from kilonova emissions using a diverse set of optical observations. These observations will be simulated to closely mimick the data expected from the Vera Rubin Observatory, covering various scenarios with both sparse and dense sampling at earlier or later times relative to the time of the event. We will also examine how assumptions about the event's distance, providing by Vera Rubin affect the accuracy of the ejecta characterization. The internship constitutes a preparatory work to a PhD.