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Electromagnetic counterparts of binary neutron star mergers with the Vera Rubin-LSST

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The deep magnitude reached by the Vera Rubin-LSST combined with the very large field covered every night may allow it to play an important role in the search for electromagnetic counterparts following the detection of gravitational waves emitted by the coalescence of a binary system of two neutron stars (or of some neutron star-black hole systems): kilonova associated with the thermal emission of the dynamical ejecta, afterglow due to the non-thermal emission during the deceleration of the relativistic jet. This search represents a complicated challenge: these sources are weak and initially poorly localized. It is necessary to start by scanning the large error box provided by the gravitational waves to identify the best candidates. A spectro-photometric follow-up by other instruments is then necessary to identify the true counterpart of the coalescence. Even more difficult, the size of the field of view makes it possible to consider the search for "orphan" kilonovae or afterglows, i.e. without any gravitational alert.
In this talk I will describe the scientific motivation of this search, the properties of the probed population, the shape of the expected emission, and then I will discuss how to best prepare this search and in particular to develop efficient criteria for the selection of the best candidates with the Rubin-LSST.

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