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ET-WST synergy for next generation gravitational wave multi-messenger observations

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The Einstein Telescope (ET), next generation gravitational wave (GW) interferometer, will explore a large volume of the Universe detecting up to ~ 10^5 binary neutron star system mergers (BNS) beyond z ~ 3, clearly revolutionizing GW multi-messenger (MM) astrophysics. Given the huge amount of EM counterpart candidates that will be provided by optical-NIR photometric observations within the large GW signal error regions, the bottleneck of GW MM science will be to gather the spectroscopic data required to discriminate against counterpart candidates, identifying and characterizing them. New observational strategies will be necessary and they have to be prepared well in advance of ET operations.
I will present the results of the simulations I carried out within the Wide-Field Spectroscopic Telescope science team and the MM Division of the ET Observational Science Board to assess the impact of next generation Integral Field and Multi-Object Spectroscopy (IFS and MOS) on the detection, identification and characterisation of EM counterparts of ET BNS. I will also give an estimate of the number of galaxies that can be found within the error volume of ET BNS detections, with a view to perform a galaxy-targeted research with WST IFS and MOS.

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