Entropy rate of non-equilibrium growing networks ARDA HALU, KUN ZHAO, Northeastern University, SIMONE SEVERINI, University College London, GINESTRA BIANCONI, Northeastern University — In order to quantify the complexity of networks, new entropy measures have recently been introduced. Most of these entropy measures pertain to static networks or to dynamical processes defined on static complex networks. In this talk, we will discuss the entropy rate of growing network models, which quantifies how many labeled networks are typically generated by those growing network models. We will present an analytical evaluation of the difference between the entropy rate of growing tree network models and the entropy of tree networks that have the same asymptotic degree distribution. We will outline our finding that growing networks with linear preferential attachment generated by dynamical models are exponentially less in number than the static networks with the same degree distribution for a large variety of relevant growing network models. We will also discuss the entropy rate for growing network models that show structural phase transitions, including models with non-linear preferential attachment. We will conclude by presenting numerical simulations showing that the entropy rates above and below the structural phase transitions follow a different scaling with the network size.