Weighted networks: Structure and modeling
MARC BARTHELEMY, CEA — In addition to topological complexity, real-world networks display a gradation in the intensity strength between nodes-the weights of the links. I will present two examples, the airline connection network and the scientific collaboration network, representative of critical infrastructure and social system respectively. These weighted networks exhibit broad distributions and non-trivial correlations of weights that cannot be explained in terms of the underlying topological structure. These results call for the need of the modeling of complex networks which goes beyond purely topological models. I will present a model which provides an explanation for the features observed in several real-world networks. This model of weighted network formation introduces a dynamical coupling between topology and weights by rearranging weights when a new link is introduced in the system.

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