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**Spring College on the Physics of Complex Systems**  
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**Thu. June 18, 11:00**

**SPEAKER: Simone PIGOLOTTI  
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**TITLE: "Thermodynamics of error corrections"**

Abstract:

Biological systems are able to copy information at a finite temperature with outstanding accuracy. This accuracy is deeply related with the non-equilibrium nature of the copy process. In biochemical reactions, such as DNA duplication, different monomers can be distinguished because of their binding energies or via non-equilibrium kinetic mechanisms. I will show how, in simple copying schemes, these two discrimination modes are mutually exclusive and lead to opposite tradeoffs between error, dissipation and reaction velocity. In non-equilibrium multi-step reactions, such as in kinetic proofreading, these different modes can be combined to improve the overall accuracy. I will conclude by discussing how the second law of thermodynamics can be used to directly relate copying accuracy with thermodynamic observables.