

Title: *Electronic noise: theory and practice*

Teacher: Federico Alimenti

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Indicative period: February – May. The course will consist of 7 lessons 3 hours each, one every 2 weeks (interested students should contact the teacher as soon as possible in order to define the lessons schedule)

ABSTRACT. Electronic noise theory is an important topic in sensors and telecommunication systems. Noise measurements are often tricky and require application specific set-up and techniques. In the first part of the course, starting from physical principles, we will review the fundamentals of electronic noise with a particular focus to microwave noise. In parallel, important system parameters will be recalled such as the equivalent noise temperature, the noise figure, the minimum noise figure and the optimum impedance for noise. The second part of the course will be devoted to noise measurements and, as a case of study, we will consider a radio receiver. Finally, in the third part, we will explore the application of microwave noise measurements to radioastronomy and the potential of these technologies for the realization of a new class of sensors: when a radio-telescope looks at the universe it simply measure the faint microwave noise produced by the stars !

PROGRAM

- Electronic noise fundamentals.
- Studying a circuit with noise.
- System and circuit noise parameters.
- Measuring the electronic noise.
- Electronic noise as an opportunity: radioastronomy and sensors.