Research Field And Department	Wireless Communications. Department of Signal Theory and Communications
Supervisor	Ana Garcia Armada
Title of the Work	Simulation of free-space optics (FSO) communications

Abstract:
Free-space optics (FSO) communications are wireless communications taking place at optical frequencies. They are similar to the classical fiber-guided but without the optical fiber, providing the flexibility of wireless communication. The optical signal is transmitted by a laser, in either a visible or not visible wavelength, and the receiver has a photodiode that converts the optical signal to electrical, to be able to further process and demodulate the information.
FSO are today of increasing interest to realize very high-speed fixed wireless links, either terrestrial or satellite and in-space communications.
The wireless optical channel has effects that are different from the better understood radio-frequency channel, such as turbulence and missalignment. It is very interesting to characterize their effects on the signal transmission and reception through simulations, which we would develop using Matlab.

Main Tasks to Carry Out:

Develop Matlab modules to represent the transmitter, channel and receiver of a FSO link.
Carry out simulations to characterize the performance of these links in different channel conditions.

References/Bibliography if required

Alain R. Ndjiongue; Telex. M. N. Ngatched; Octavia A. Dobre; Ana Garcia Armada; Harald Haas, "Analysis of RIS-Based Terrestrial-FSO Link Over G-G Turbulence With Distance and Jitter Ratios", Journal of Lightwave Technology
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