

# Performance Analysis of Mixed MIMO RF/FSO DF Relaying Based on Globally Coupled Low Density Parity Check (GC-LDPC) Codes

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**(Pt9)Abstract**—In this work, we analyze the performance of the use of error correcting codes in particular the LDPC codes with global coupling (GC-LDPC) in a double-hop relay system composed of links with multiple inputs and multiple outputs at radio frequency / free space optics (MIMO-RF/FSO). A multi-antenna listener listens to the information by decoding the signals received from the source node. In addition, to decode the signals we use two-phase local-global decoding. To eliminate interference in the first hop we use the interference alignment technique (IA) we also assume that the source-relay link undergoes Rayleigh fading, and that the relay-destination link is affected by the degradations of the channel optics, including path loss, atmospheric turbulence, and pointing errors. Using DF relay technology, mixed MIMO-RF/FSO systems combine the advantages of RF and FSO communication technologies. The use of mixed MIMO-RF/FSO cooperative transmission systems can improve network reliability and transmission. Results demonstrate improved performance of MIMO-RF / FSO DF cooperative relay system based on GC-LDPC codes with multiple antennas compared to MIMO-RF / FSO systems without the use of GC-LDPC codes, but also to systems SISO (Single-Input Single-Output) RF-FSO DF proposed in the existing literature..

**(Pt9)Keyword**—Free Space Optics (FSO), Multiple Input Multiple Output (MIMO), atmospheric turbulence, Bit Error Rate (BER), Pointing errors, Radio frequency (RF), globally coupled low density parity check codes (GC-LDPC), Gamma-Gamma Fading, Rayleigh fading.

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