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**ECE-408: Wireless Communications**  
**Wireless Standard Simulation Proposal**  
**IEEE 802.11a**

For this project, I would like to implement several components of the physical layer described in the IEEE 802.11a standard<sup>1</sup>. The standard defines requirements for an orthogonal frequency division multiplexing (OFDM) system; under this system, eight standard transmission rates (ranging from 6 to 54 Mbit/s, as shown in Table 78 of the standard) are defined, with varying modulation schemes and data rates across the different transmission rate options. According to the introduction of the specification for the 5 GHz band, the system uses 52 subcarriers that are modulated with BPSK, QPSK, 16-QAM, or 64-QAM, and employs convolutional coding with coding rates of 1/2, 2/3, or 3/4.

In simulating this standard, I would like to simulate an entire link; however, due to time constraints, this may not be feasible. Therefore, I intend to implement the systems sequentially, beginning with the lowest data rate and moving upwards. Each system would consist of error correction encoding, interleaving, modulation, and OFDM transmission on the transmitter side, and conversely OFDM reception, demodulation, deinterleaving, and decoding on the receiver side. I intend to model the channel as AWGN, and present BER curves for comparison between the different transmission rates and modulation schemes.

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<sup>1</sup> IEEE-SA Standards Board, IEEE Std 802.11a-1999(R2003), Supplement to IEEE Std 802.11-1999.