

**Old Dominion University**  
**Batten College of Engineering & Technology**  
**Department of Electrical and Computer Engineering**

Thesis Defense

**PHYSICAL LAYER SECRET KEY AGREEMENT USING ONE-BIT  
QUANTIZATION AND LOW-DENSITY PARITY-CHECK CODES**

**John Snoap**

**Monday, November 14th @ 11:00am in KH239**

Physical layer approaches for generating secret encryption keys for wireless systems using channel information has attracted increased interest from researchers in recent years. This paper presents a new approach for calculating log-likelihood ratios (LLRs) for secret key generation that is based on one-bit quantization of channel measurements and the difference between channel estimates at legitimate reciprocal nodes. The studied secret key agreement approach, which implements advantage distillation along with information reconciliation using Slepian-Wolf low-density parity-check (LDPC) codes, is discussed and illustrated with numerical results obtained from simulations. These results show the probability of bit disagreement for keys generated using the proposed LLR calculations compared with alternative LLR calculation methods for key generation based on channel state information. The proposed LLR calculations are shown to be an improvement to the studied approach of physical layer secret key agreement.

**Committee:**

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