Intelligent reflecting surface (IRS) is a promising technology to secure the LoS dominated low-entropy channels, by:
- Induce randomness via IRS phases
- Extra space for beamforming
- Artificial noise for anti-jamming

However, the IRS-induced randomness is also contained in the Eves’ received signals, which enables the estimation of the legitimate channel by multiple & cooperative Eves.

### 3. Random-Matrix based PL-SKG

Recalling from the Multi-Eve design that the prerequisite of channel estimation by Eves is the known of pilot sequences $u_A, u_B$. This inspires us to use random matrices instead of the public known pilot sequences. And this is random-matrix based PL-SKG.

#### Theory behind Random-Matrix based PL-SKG

The deployment of $N$ Eves is to ensure the mutual information between $N$ Eves’ received signals and the legitimate channel equal the information entropy of the latter, which suggests a successful estimation of the legitimate channel from Eves.

#### Results

The result shows our proposed random matrix based PL-SKG:

(i) comparatively superior (up to 300%) secret key rate in low SNR regime, attributed to the noise resistance ability of the singular values

(ii) generally improved secret key rate performance against Multi-Eves.

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