

# On the Jamming Rejection Features of Near-field Beamforming

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**Abstract**—Large multiple antenna systems have been widely used in 5G for improved spectral efficiencies. For 6G, even bigger arrays are being proposed to obtain larger gains and/or to reduce interference levels. When the physical size of the array is large compared to the propagation distance, communication might occur in the near-field regime, which requires channel models that capture the curvature of the spherical waves. In this paper, we consider the near-field communication regime and study the jamming rejection features of an extremely large array (ELAA). Due to the focusing effect available in the near-field, it is shown that the jamming rejection features in this region are much stronger than the ones associated with far-field. Therefore, near-field beam-focusing constitutes an interesting physical layer security (PLS) technique for 6G communications.

**Index Terms**—multiple-input multiple-output (MIMO), extremely large antenna arrays (ELAAs), near-field communications, physical layer security (PLS), achievable capacity