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Quantum codes from generalized quadrangles

Entanglement-assisted quantum error correcting code (EAQECC) utilizes e copies of maximally entangled states (the code requires e ebits). The EAQECC model removes the self-orthogonality requirement imposed on stabilizer quantum codes. The number of ebits should be small. For an LDPC EAQECC that uses one ebit, Fujiwara and Tonchev showed recently that the girth of its Tanner graph is at most six. We study the LDPC EAQECC that arises from the symplectic generalized quadrangle $W(q)$ where q is even. The girth of the Tanner graph is eight and we prove that the proportion of ebits tends to zero as q grows.