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Michael Kiermaier* (michael.kiermaier@uni-bayreuth.de) and **Alfred Wassermann** (alfred.wassermann@uni-bayreuth.de). *On the weight distribution of extended \mathbb{Z}_4 -linear quadratic residue codes.* Preliminary report.

The class of the extended quadratic residue codes (QR-codes) over the ring \mathbb{Z}_4 contains very good \mathbb{Z}_4 -linear codes. It is well known that the Gray images of the QR-codes over \mathbb{Z}_4 of length 8, 32 and 48 are non-linear binary codes of higher minimum Hamming distance than comparable known linear codes.

Utilizing the 3-transitivity of the permutational part of the automorphism groups of the \mathbb{Z}_4 -linear QR-codes, we developed a fast algorithm to count the number of codewords of a given symmetrized weight. We were able to compute the minimum Lee and Euclidean distances up to length 104, and the symmetrized weight enumerators for lengths divisible by 8 up to length 80.

The QR-code of length 80 has minimum Lee distance 26 and minimum Euclidean distance 32. Thus it is a new example of an extremal Type II code over \mathbb{Z}_4 , and its Gray image is better than any known comparable linear code. (Received August 23, 2008)