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Modular Reduction of the Steinberg Lattice of the General Linear Group

The mod ℓ reduction of the Steinberg lattice of $G = \mathrm{GL}(n, q)$ is known not to be irreducible when ℓ divides the index $[G : B]$ of the upper triangular group B in G . In 2003 R. Gow produced a canonical filtration for this reduced module, and conjectured that all non-zero factors are irreducible. The bottom factor is the socle, which has been known to be irreducible for some time. We consider the next factor of Gow's filtration, lying just above the socle, and prove it to be irreducible in the particular case when ℓ divides $q + 1$.