1151-11-134 **Sven Möller*** (`math@moeller-sven.de`) and **Nils R. Scheithauer**. *Dimension Formulae and Generalised Deep Holes of the Leech Lattice Vertex Operator Algebra.* Preliminary report.

We prove a dimension formula for the weight-one space of a vertex operator algebra $V^{\mathrm{orb}(g)}$ obtained in the orbifold construction associated with a strongly rational, holomorphic vertex operator algebra V of central charge 24 and a cyclic group $\langle g \rangle$ of arbitrary order n. Based on a lower bound extracted from this formula we introduce the notion of extremal automorphisms. These automorphisms are in turn central in the definiton of what we call generalised deep holes in $\mathrm{Aut}(V)$.

We then give a construction of all 70 strongly rational, holomorphic vertex operator algebras of central charge 24 with non-vanishing weight-one space as orbifold constructions associated with generalised deep holes of the Leech lattice vertex operator algebra V_Λ. For the first time, this provides a uniform construction of these vertex operator algebras and naturally generalises the construction of the 23 Niemeier lattices with non-vanishing root system from the deep holes of the Leech lattice Λ by Conway and Sloane. (Received August 14, 2019)