

# Homology spheres and cyclic branched coverings of knots

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**Abstract.** We discuss work in collaboration with Boileau-Paoluzzi and Mecchia-Reni on the following problem: given a homology 3-sphere  $M$  (or more generally, a closed orientable 3-manifold), for how many distinct primes  $p$  can  $M$  be a  $p$ -fold cyclic branched covering of knots in the 3-sphere? For a homology sphere  $M$ , there are five such primes if and only if  $M$  is the 3-sphere, and this result is best possible (this might remain true also for arbitrary 3-manifolds).