

# Connected Sums of Gorenstein Artin Rings

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## Abstract

Gorenstein rings, due to their various kinds of symmetries and duality properties, form an important and ubiquitous class of rings. In 2012 Ananthnarayan, Avramov and Moore introduced a new construction of Gorenstein rings (cf. H. Ananthnarayan, L. L. Avramov, W. F. Moore, *Connected sums of Gorenstein local rings*, J. Reine Angew. Math. **667** (2012), 149 – 176). They defined a *connected sum* of two Gorenstein local rings as an appropriate quotient of their fiber product. Although the fiber product is rarely Gorenstein, they proved that a connected sum of two Gorenstein local rings is always a Gorenstein ring.

In this talk, we discuss connected sums  $R\#_k S$  of Gorenstein Artin local rings  $R$  and  $S$  over their common residue field  $k$ . We give a characterization for Gorenstein Artin local rings to be decomposable as connected sums. We also investigate conditions which force Gorenstein Artin local rings to be indecomposable as connected sums. – This presentation is based on a joint work with H. Ananthnarayan, J. Laxmi, and Z. Yang in H. Ananthnarayan, E. Celikbas, J. Laxmi, Z. Yang, *Decomposing Gorenstein rings as connected sums*, Journal of Algebra, **527** (2019) 241–263. .

**Keywords:** Gorenstein rings, Artinian rings, local rings, connectex sum, fiber product.