Abstract: Let A be a filtered Poisson algebra with Poisson bracket $\{,\}$ of degree -2. A *star product* on A is an associative product $*: A \otimes A \to A$ given by

$$a * b = ab + \sum_{i \geq 1} C_i(a, b),$$

where C_i has degree $-2i$ and $C_1(a,b) - C_1(b,a) = \{a, b\}$. We call the product $*$ *even* if $C_i(a,b) = (-1)^i C_i(b,a)$ for all i, and call it *short* if $C_i(a,b) = 0$ whenever $i > \min(\deg(a), \deg(b))$.

Motivated by three-dimensional $N = 4$ superconformal field theory, In 2016 Beem, Peelaers and Rastelli considered short even star-products for homogeneous symplectic singularities (more precisely, hyperKähler cones) and conjectured that that they exist and depend on finitely many parameters. We prove the dependence on finitely many parameters in general and existence for a large class of examples, using the connection of this problem with zeroth Hochschild homology of quantizations suggested by Kontsevich.

Beem, Peelaers and Rastelli also computed the first few terms of short quantizations for Kleinian singularities of type A, which were later computed to all orders by Dedushenko, Pufu and Yacoby. We will discuss some generalizations of these results.

This is joint work with Eric Rains and Douglas Stryker.