Abstract. We introduce a new algebra $D_q(Mat_d(Q))$ associated to a quiver $Q$ and dimension vector $d$, which yields a flat (PBW) $q$-deformation of the algebra of differential operators on the space of matrices associated to $Q$. This algebra admits a $q$-deformed moment map from the quantum group $U_q(gl_d)$, acting by base change at each vertex. The quantum Hamiltonian reduction, $A^\xi_d(Q)$, of $D_q$ by $\mu_q$ at the character $\xi$, is simultaneously a quantization of Crawley-Boevey and Shaw’s multiplicative quiver variety, and a $q$-deformation of Gan and Ginzburg’s quantized quiver variety.

Specific instances of the data $(Q, d, \xi)$ yield $q$-deformations of familiar algebras in representation theory: for example, the spherical DAHA’s of type $A$ arise from Calogero-Moser quivers, quantizations of parabolic character varieties (Deligne-Simpson moduli spaces) arise from comet-shaped quivers, and algebras of difference operators on Kleinian singularities arise from affine Dynkin quivers.