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Anders Buch*, 110 Frelinghuysen Rd, Piscataway Township, NJ 08854, and **Chengxi Wang**.

Positivity determines quantum cohomology.

I will show that the small quantum cohomology ring of a Grassmannian is, up to rescaling the deformation parameter q , the only graded q -deformation of the singular cohomology ring with non-negative Schubert structure constants. This implies that the (three point, genus zero) Gromov-Witten invariants are uniquely determined by Witten's presentation of the quantum ring and the fact that they are non-negative. A similar statement appears to be true for any flag variety of simply laced Lie type. For the variety of complete flags, this statement is equivalent to Fomin, Gelfand, and Postnikov's conjecture that the quantum Schubert polynomials are uniquely determined by positivity properties. The proof for Grassmannians answers a question of Fulton. (Received September 16, 2019)