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Slope inequality and Miyaoka-Yau type inequality

Let S be a minimal smooth projective surface of general type over an algebraically closed field of characteristic $p > 0$. In this talk (joint with Yi Gu and Mingshuo Zhou), I will show a slope inequality and its colloary: a Miyaoka-Yau type inequality. In particular, it implies that $\chi(O_S) > 0$ for any smooth surfaces S of general type (a question posed by Shepherd-Barron on 1991).