GLOBAL EXISTENCE OF A SOLUTION OF THE **VLASOV-DIRAC-BENNEY EQUATION** WITH A LINEAR RELAXATION TIME COLLISION OPERATOR

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Vlasov-Dirac-Benney Eq. with collisions

$$\partial_t f + \nabla_p \epsilon(p) \cdot \nabla_x f - \nabla_x V_f \cdot \nabla_p f = -\frac{f}{\tau} \tag{1}$$

- We consider

$$V_f(x,t) := \int_{\mathbb{T}^d} f(x,p,t)dp$$

in contrast to the Coulomb potential

$$V_f^C(x,t) := \int_{\mathbb{T}^d} \Delta_x^{-1} f(x,p,t)dp.$$

- We allows collisions.

Theorem

$$\|f|_{t=0}\| := \sum_{\alpha,\beta\in\mathbb{N}_0^d} \frac{\nu^{\alpha+\beta}}{\alpha!\beta!} \|\partial_x^\alpha \partial_p^\beta f|_{t=0}\|_{L^\infty(\mathbb{R}_x^d \times \mathbb{T}_p^d)} \ll 1$$

$\Rightarrow$ Unique **global** analyitc **solution**.