



Department of Mathematics  
The Chinese University of Hong Kong

Phone: (852) 3943 7988-9 • Fax: (852) 2603 5154 • Email: dept@math.cuhk.edu.hk  
Rm. 220, Lady Shaw Building, The Chinese University of Hong Kong, Shatin, N.T., Hong Kong

*For Favour of Posting*

數學系  
香港中文大學

# Kinetic Lecture Series

## Regularity of the Vlasov-Poisson-Boltzmann System without angular cutoff

By

**Mr. Dingqun DENG**  
*City University of Hong Kong*

### Abstract:

In this paper we study the regularity of the non-cutoff Vlasov-Poisson-Boltzmann system for plasma particles of two species in the whole space  $R^3$  with hard potential. The existence of global-in-time nearby Maxwellian solutions is known for soft potential from [Duan and Liu, CMP, 2013]. However, the smoothing effect of these solutions has been a challenging open problem. We establish the global existence and regularizing effect to the Cauchy problem for hard potential with large time decay. Hence, the solutions are smooth with respect to  $(t, x, v)$  for any positive time  $t > 0$ . This gives the regularity to Vlasov-Poisson-Boltzmann system, which enjoys a similar smoothing effect as Boltzmann equation. The proof is based on the time-weighted energy method building also upon the pseudo-differential calculus.

Date : February 23, 2021 (Tuesday)

Time : 3:00pm to 5:00pm (Hong Kong SAR)

Zoom link:

<https://cuhk.zoom.us/j/95234168226?pwd=TVl3YnBBZUFGMUdUdzdGdnNpeDRHQQT09>

Meeting ID : 952 3416 8226

Passcode : 660406

*All are Welcome*