

Institut Henri Poincaré  
11 rue Pierre et Marie Curie, 75231 Paris cedex 05  
**String Theory in Greater Paris**

**Rencontres Théoriciennes**  
**“Supergravité, théorie des cordes et théorie M”**

*Jeudi 25 Mars 2021, 11:00*

**Blaise Goutéraux**

*Ecole Polytechnique*

**Hydrodynamic diffusion and its breakdown near AdS<sub>2</sub> fixed points**

*Hydrodynamics provides a universal description of interacting quantum field theories at sufficiently long times and wavelengths, but breaks down at scales dependent on microscopic details of the theory. We use gauge-gravity duality to investigate the breakdown of diffusive hydrodynamics in two low temperature states dual to black holes with AdS<sub>2</sub> horizons. We find that the breakdown is characterized by a collision between the diffusive pole of the retarded Green's function with a pole associated to the AdS<sub>2</sub> region of the geometry, such that the local equilibration time is set by infra-red properties of the theory. The absolute values of the frequency and wavevector at the collision ( $\omega_{eq}$  and  $k_{eq}$ ) provide a natural characterization of all the low temperature diffusivities  $D$  of the states via  $D = \omega_{eq}/k_{eq}^2$  where  $\omega_{eq} = 2\pi\Delta T$  is set by the temperature  $T$  and the scaling dimension  $\Delta$  of an infra-red operator. We confirm that these relations are also satisfied in an SYK chain model in the limit of strong interactions.*

**Institut Henri Poincaré, salle 314, 3<sup>ème</sup> étage**

Retrouvez les activités de la communauté parisienne de théorie des cordes sur  
<http://string.lpthe.jussieu.fr>  
La liste de tous les séminaires en région parisienne est disponible sur  
<http://string.lpthe.jussieu.fr/semparis>

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