Diffusiophoresis in cellular flows

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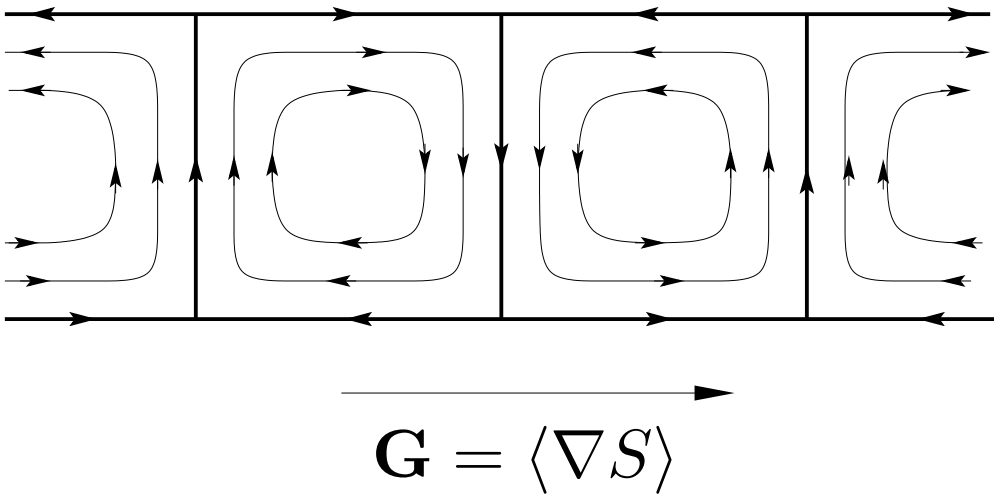


- Cellular flow **u**
- Imposed mean salt gradient **G**

- diffusing **phoretic particles**

$$\mathbf{v} = \mathbf{u} + \mathbf{v}_{\mathrm{dp}}$$

Drift velocity $\boxed{\mathbf{v}_{\mathrm{dp}} = \alpha \nabla S}$

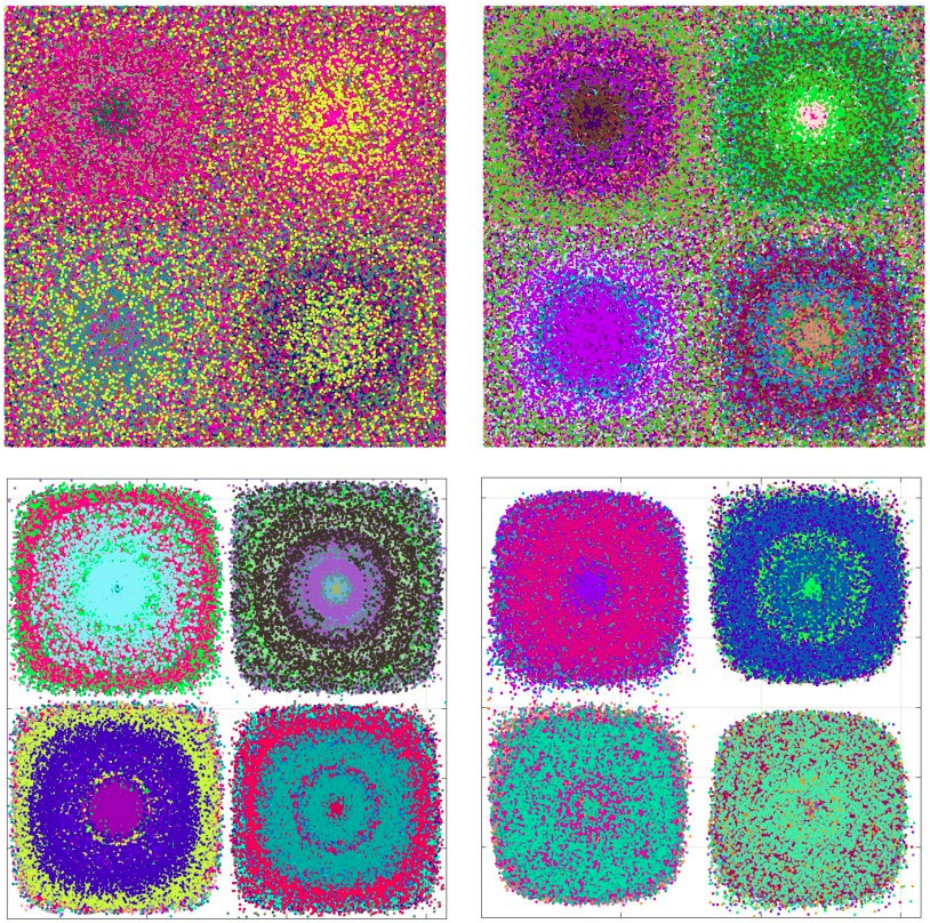
Can we calculate the mean particles velocity <v> ?

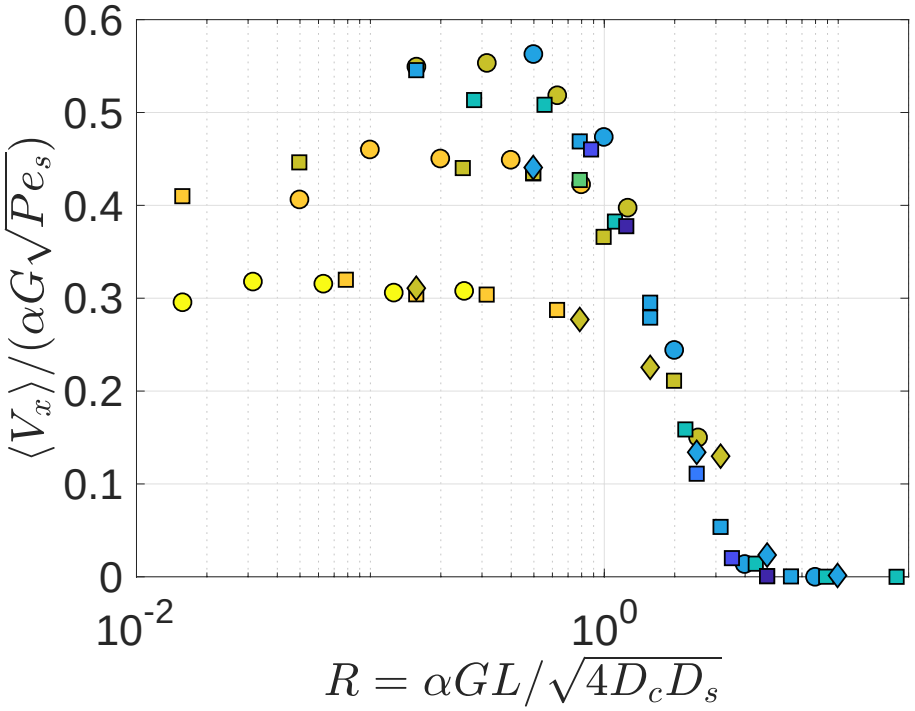
$$\langle \mathbf{v} \rangle \sim \cancel{\langle \mathbf{u} \rangle} + \alpha \langle \nabla S \rangle \sim \alpha \mathbf{G} \ ?$$

From enhanced dispersion to blockage

- Velocity **higher** than expected
- For large α: **blockage**

$\Rightarrow$ { theoretical velocity v_{theo} ; blockage coefficient R }





$\Rightarrow v/v_{theo} = f(R)$

(many different parameters)