

## **[P2] Resolving the Gibbs paradox in small thermodynamic systems**

*Yuto Murashita, University of Tokyo*

The Gibbs paradox originates from gas mixing, and is closely related to the foundation of statistical mechanics. Although the Gibbs paradox is often erroneously believed to be resolved by the quantum statistical mechanics, it is in fact resolved based on the assumption of extensivity in macroscopic thermodynamic systems. However, this resolution cannot apply to small thermodynamic systems because extensivity breaks down. We offer a resolution applicable to small thermodynamic systems based on our fluctuation theorem.