

MONDAY

COLLOQUIUM

Entropy of mixing and entropy of assimilation

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6 Jan 2025 (Monday) | 16:00 Hrs (Tea / Coffee 15:45 Hrs) | Venue: TIFRH Auditorium

This lecture is addressed to anyone who has studied thermodynamics. It is more of an “educational”, or pedagogical character, rather than a research topic. The main idea is that contrary to what is written in most textbooks, mixing of ideal gases, by itself, does not affect any thermodynamic property of the system. In particular, the entropy of the system does not change when mixing ideal gases. Hence, thermodynamically speaking, mixing, by itself, is a “non-thermodynamic-process”. The process of mixing can be either reversible or irreversible. The same is true for de-mixing processes. The process of assimilation, involving indistinguishable particles is introduced. It is shown that assimilation does affect the entropy of a system. The informational-theoretical aspects of mixing and assimilation are discussed.

References:

1. A. Ben-Naim, Is mixing a thermodynamic process? *Am. J. Phys.*, 55, 725-733 (1987).
2. A. Ben-Naim, Mixing and assimilation in systems of interacting particles, *Am. J. Phys.*, 55, 105-109 (1987).
3. A. Ben-Naim, *Molecular Theory of Solutions*, Oxford University Press (2006).