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Granular statistical mechanics – Building on the legacy of Sir Sam Edwards[1]

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When Sir Sam Edwards laid down the foundations for the statistical mechanics of jammed granular materials he opened a new field in soft condensed matter and many followed. In this presentation we review briefly the Edwards formalism and some of its less discussed consequences. We point out that the formalism is useful for other classes of systems - cellular and porous materials. A certain shortcoming of the original formalism is then discussed and a modification to overcome it is proposed. Finally, a derivation of an equation of state with the new formalism is presented; the equation of state is analogous to the PVT relation for thermal gases, relating the volume, the boundary stress and measures of the structural and stress fluctuations.

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