

Negative Pressure States

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Condensed matters (liquids and solids) can be expanded into negative pressure states. Although these states are metastable, their long lifetime makes them appropriate for experimental investigations. Some relevant behaviour of liquids and solids under these states will be reviewed, including the shift of characteristic points (like melting or glassification temperature of crystalline or amorphous materials), the appearance/disappearance of liquid-liquid miscibility phenomena in some binary liquids or the ultimate stability of liquids (spinodal) and solids (spall strength). Examples for extreme strength of some material will be shown; for example under special conditions, liquid water can survive -100 MPa (-1000 bar) negative pressure, i.e. isotropic, tri-axial stretch, without “breaking”, i.e. vapourization. Also, some laboratory techniques for experimental realization of these states will be shown and they will be compared to negative pressure states found in the Nature.