# Medium range order and mechanical properties in glasses

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We study rigidity transitions in network glasses using size-increasing cluster approximations and mechanical constraint counting algorithms. Possible consequences of the presence of self-organization are examined. The analysis reveals two transitions instead of the usual (mean-field) Phillips transition. One from a floppy to an isostatic rigid phase at a mean coordination number $< r_{c1} >$ where the number of floppy modes vanishes and a second one from an isostatic to a stressed rigid phase at $< r_{c2} >$. The value of the two critical mean coordination numbers as well as the width $\Delta < r >=< r_{c2} > - < r_{c2} >$ of the intermediate phase depend very strongly on the presence of medium range order elements such as rings. We illustrate the results with binary chalcogenides.