Question #53190, Physics / Solid State Physics

if S is stress and Y is young's modulus of a wire material, what is the energy stored in the wire per unit volume ?

Answer:

Energy stored per unit volume can be defined: $E = (S \times \varepsilon)/2$, where S – stress and ε – strain

Taking into account that ε equals: $\varepsilon = S/Y$, where Y –is Young's module.

Thus, $E = (S \times S)/(2Y) = S^2/(2Y)$