

## Re: what is the relation between force and energy?

Source: <http://sci.tech-archive.net/Archive/sci.physics/2004-09/8401.html>

---

**From:** Old Man ([nomail\\_at\\_nomail.net](mailto:nomail_at_nomail.net))

**Date:** 09/21/04

Date: Tue, 21 Sep 2004 17:20:41 -0500

"Bjoern Feuerbacher" <[feuerbac@thphys.uni-heidelberg.de](mailto:feuerbac@thphys.uni-heidelberg.de)> wrote in message news:cipc8p\$nnu\$2@news.urz.uni-heidelberg.de...

> yogesh wrote:

> >>No. Why do you think so? Pressure has the same units as energy/volume.

> >>But pressure is not the same as energy density!

> >

> > IN thermodynamics while calculating the enthalpy(i.e the total energy

> > content) of a system we consider pressure-volume energy also..

> >  $H = U + PV$ .(i.e internal energy + pressure volume energy)

> >

> > Now definitely here, the pressure is considered as a energy density.

>

> Hum, yes, something like that. But your claim was:

> "But if I know the pressure ( or if I can calculate the pressure from the forces) then certainly I know the energy/volume of the system."

>

> The formula  $H = U + pV$  does not support that claim in any way!

>

> Bye,

> Bjoern

In  $H = U + PV$ , What is included in U ?

- 1) Kinetic energy of molecular rotation and internal vibrations ?
- 2) Potential energy of interactions between gas molecules ?

It would seem that 2) would be included in the pressure, P.

Estimating the vapor pressure of a solution via molecular number density is approximate, possibly because solute ionization isn't complete and the effect of that on the electric dipole moment of the water molecule. Is there a concise explanation for the rather large deviations from empirical determination ?

As a physicist, it's humiliating to resort to tables in the "Handbook of Chemistry & Physics" rather than to

sci.physics: Re: what is the relation between force and energy?

calculate it outright, especially when many organic solutes aren't listed.

Usually clear and concise, Landau & Lifshitz in "Statistical Mechanics" aren't at all clear on this subject.

[Old Man]