Temperature is a measure of the average kinetic energy of the particles in matter

- Lower energy = cooler
- Higher energy = warmer

Effects of temperature on the state of matter

Interesting Facts:

- atmospheric pressure



• Is there an absolute minimum and maximum temperature ? • Absolute minimum is accepted to be -459.7 Degrees Fahrenheit

Solid: matter that has a fixed volume and shape-

• Liquid : matter that has a fixed volume but not a fixed shape -

• Gas: matter that does not have a fixed volume or a fixed shape-

• Condensation point: the temperature at which matter becomes a liquid

• Freezing point: the temperature at which matter becomes a solid

• Cryogenics is the study or production of very low temperatures between -238 and -459.7 Degrees Fahrenheit. • Your home refrigerator and automobile air-conditioning systems use a refrigerant called Freon • JLAB uses helium as a refrigerant because it is the only known substance that is not a solid at -456 F and normal

• Helium will only freeze at -458 F and pressures greater than 25 times normal atmospheric pressure • JLAB maintains more than 20,000 gallons of liquid helium on site to cool the cryomodules and magnets





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100 F 70 F normal room temperature 32 F water freezes -60 F lowest natural temperature on earth -70 F carbon dioxide freezes -120 F acetylene freezes

130 F highest natural temperature on earth

- -165 F alcohol freezes
- -216 F butane freezes
- -252 F freon R-12 freezes
- -310 F propane freezes
- -346 F oxygen freezes
- -362 F nitrogen freezes
- -409 F neon freezes
- -435 F hydrogen freezes

-456 F JLAB Operating Point -459.7 F absolute minimum temperature

(depending on the pressure)



