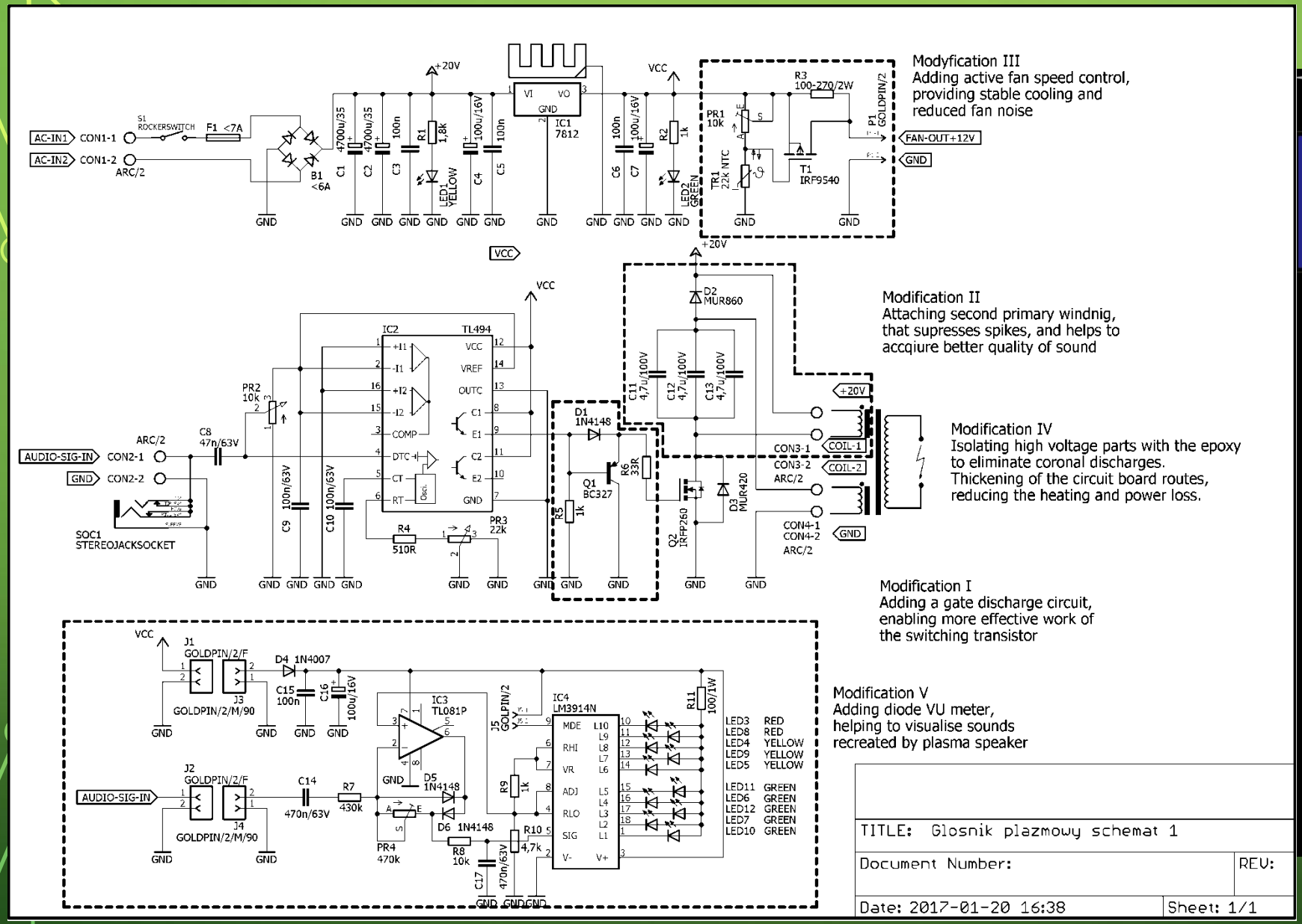
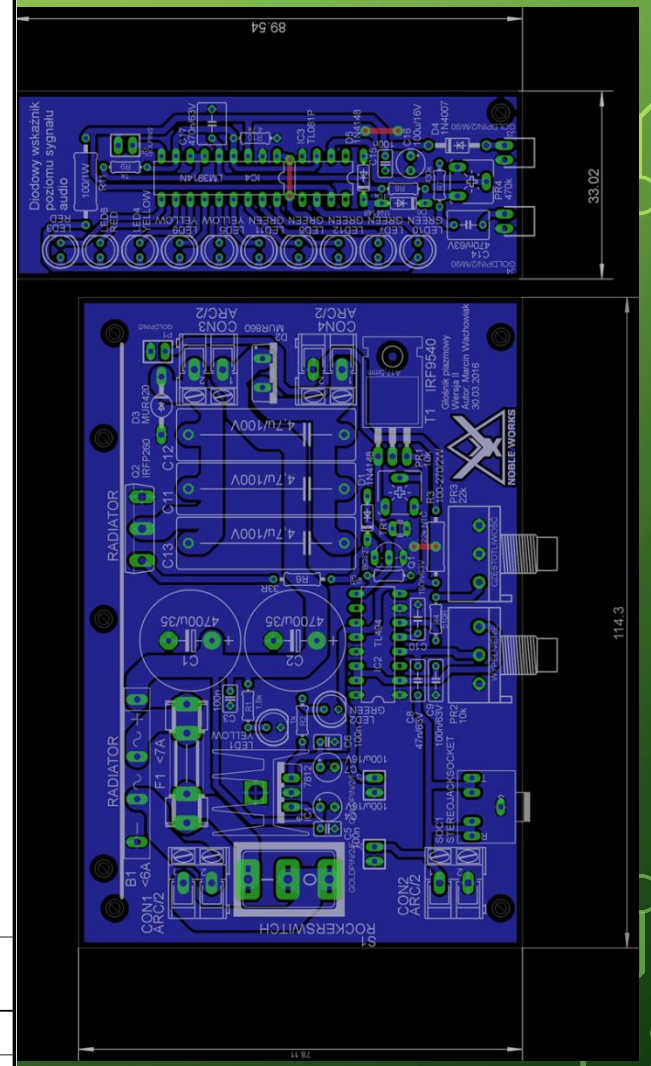
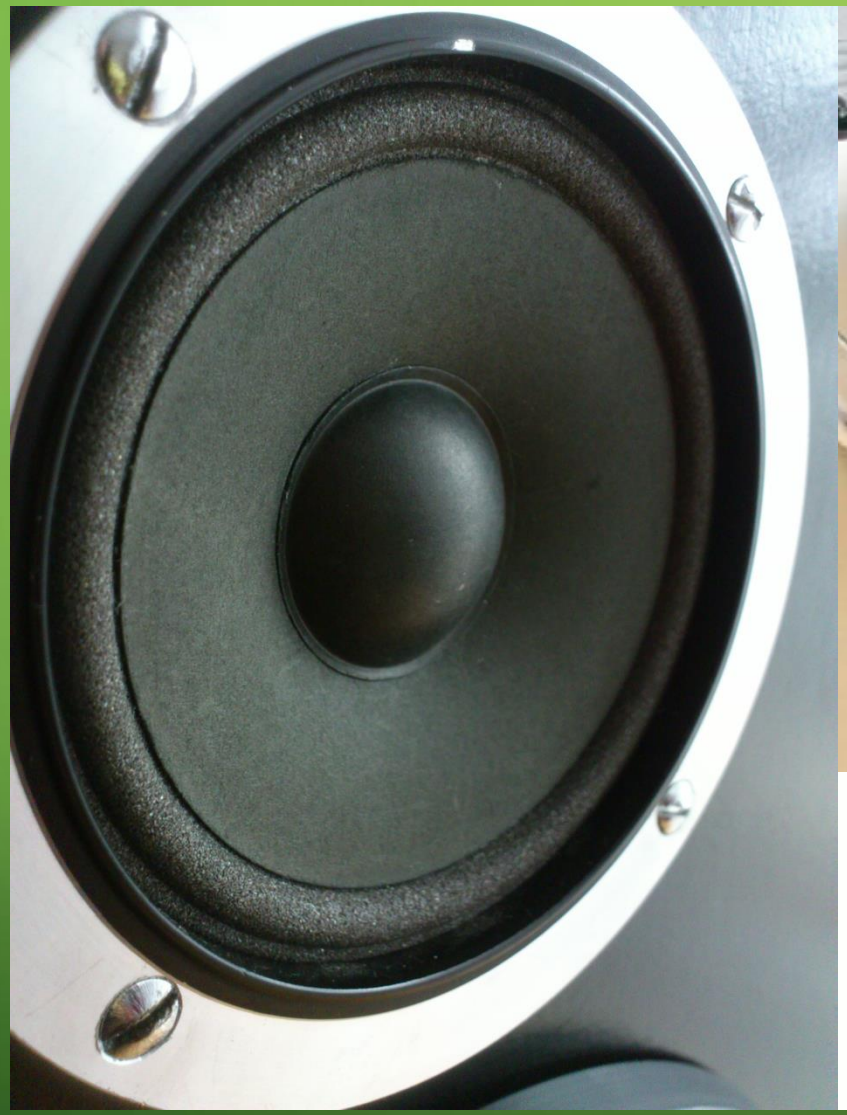
„PLASMA SPEAKER: PLASMA AND ITS UNUSUAL PROPERTIES”

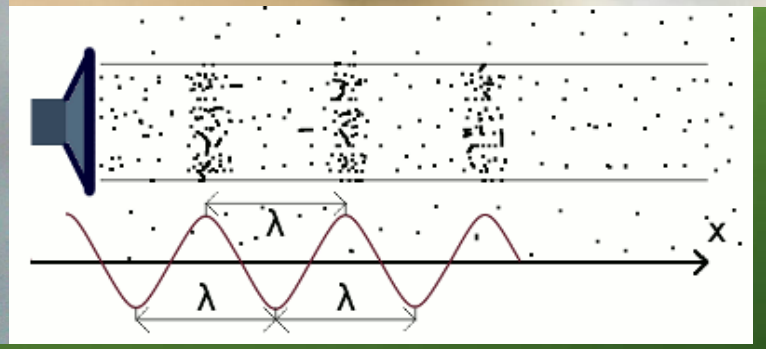
AN EXPERIMENT SHOW





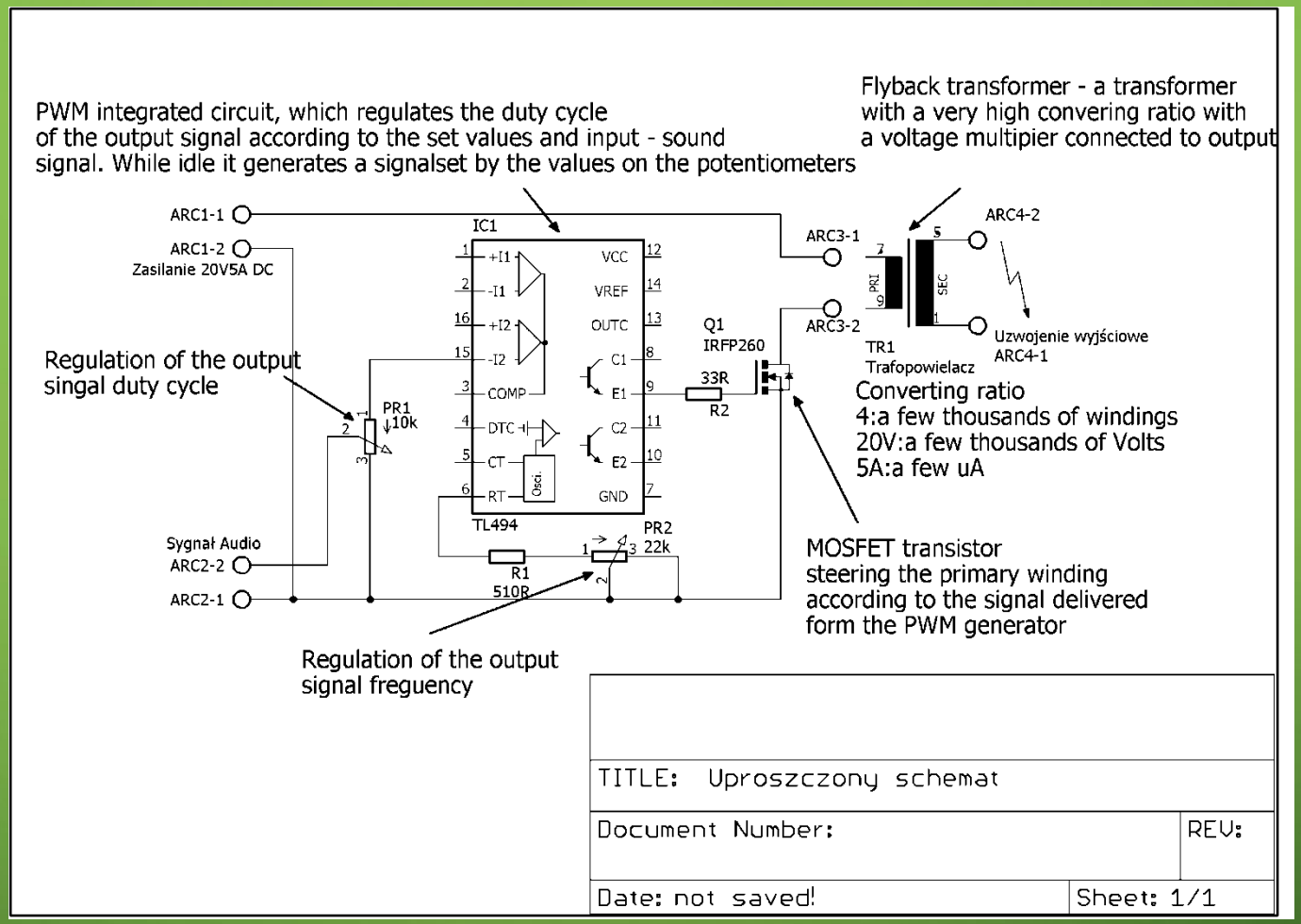
Scheme and the circuit board created by the author of the performance.





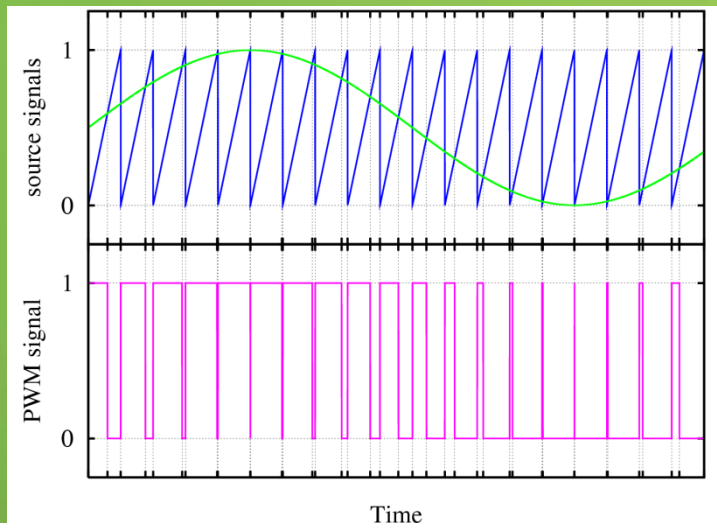
Creation of a sound wave

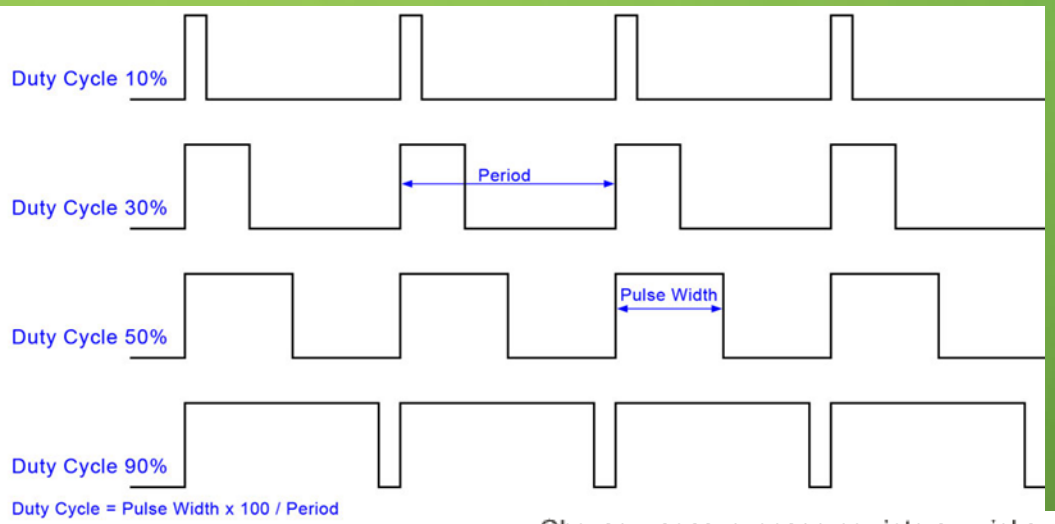
Recreating sound by plasma

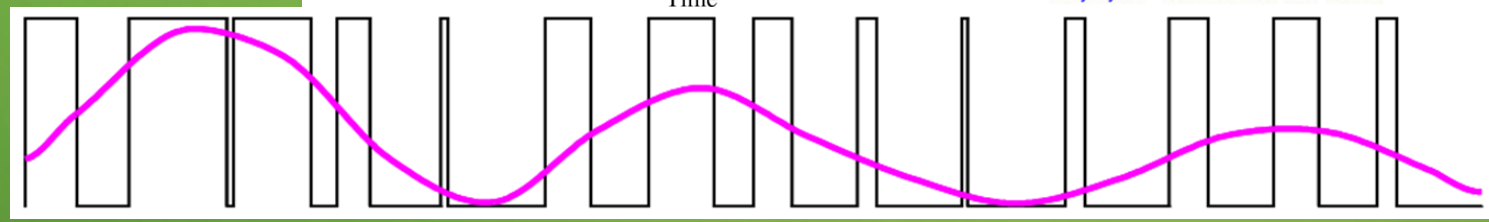


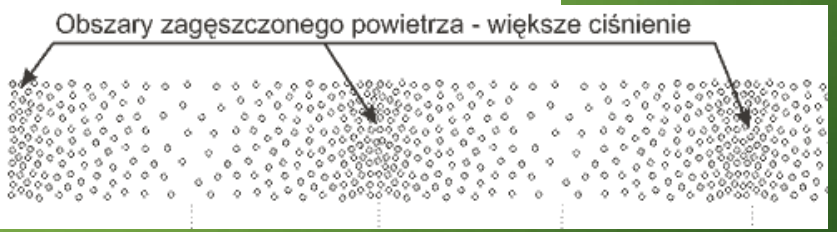
Laboratory power supply	PWM generator	Switching transistor and primary winding	Secondary winding and electrodes of the speaker	Electrodes and space between them	Gas present between the electrodes	Electric arc
• Provides the constant voltage with the current limitation	• Generates square wave signal with constant frequency and modulated duty cycle	• Generates the high-current signal delivered to the flyback transformer	• Converts the high-current signal to the high-voltage signal	• Presence of high voltage creates strong magnetic field between the electrodes	• Strong electro-magnetic field causes air to ionise and an electric discharge is present	• By the constant flow of current the discharge stabilises and the electric arc is present

Analysis of the generating the HV









Electrical sound signal → PWM generator → „Condesations and rarefactions"of the steering signal → Changes in voltage and current of the output HV signal → „Condensations and rarefactions" of plasma (changes in density) → Creation of an acoustic wave

Recreating sound by plasma

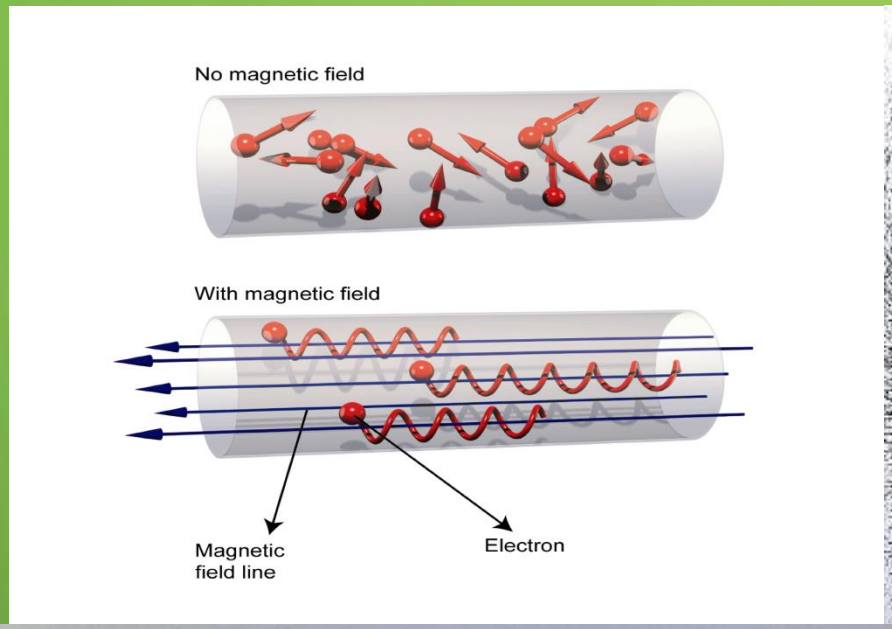
Similarities

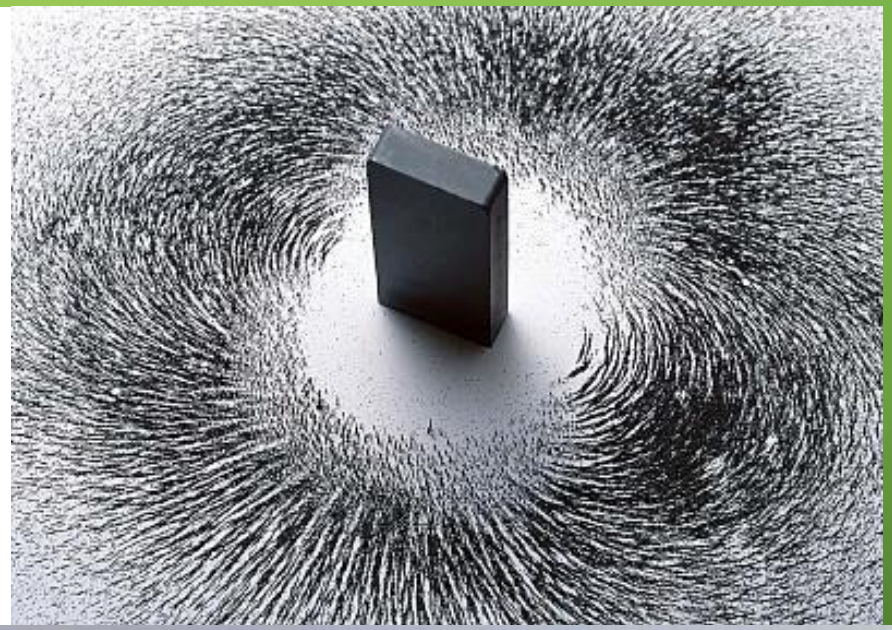
- Consist of the same particles
- Enable the flow of current
- React to magnetic field

Differences

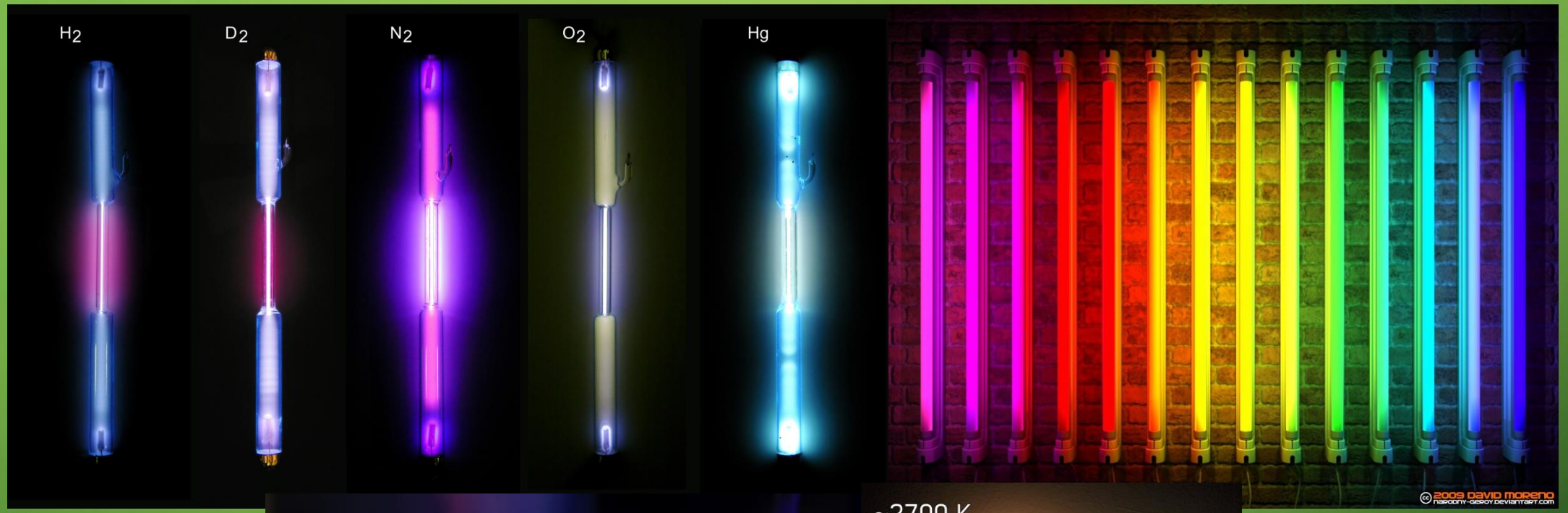
- Temperature
- Density of the ions and electrons

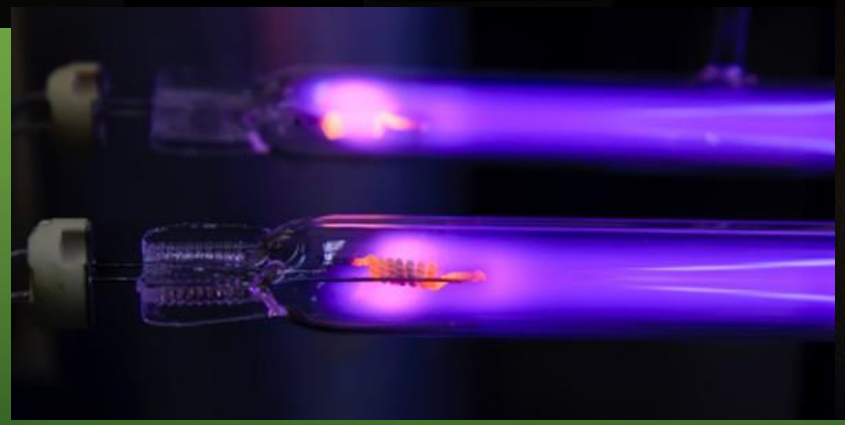
Flame and plasma



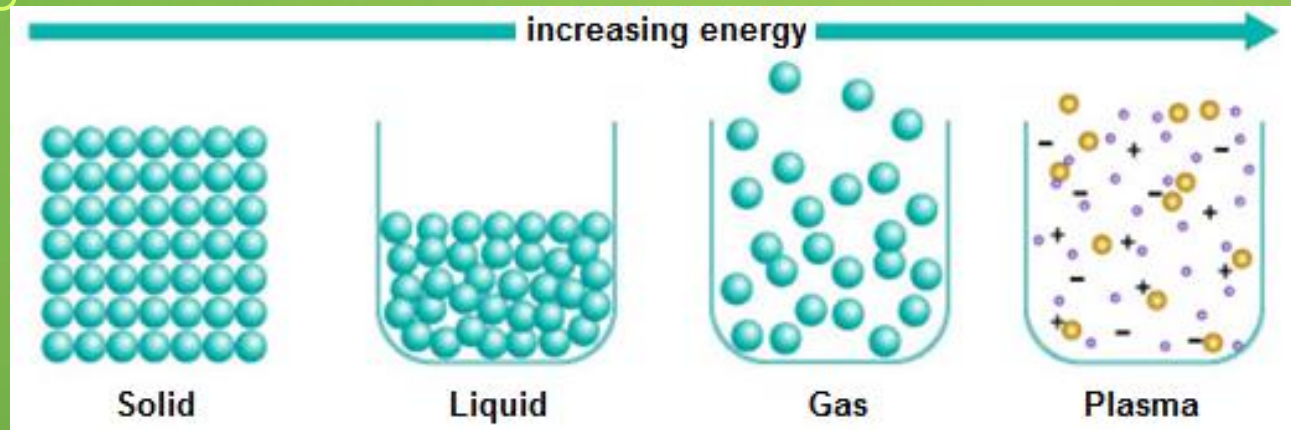


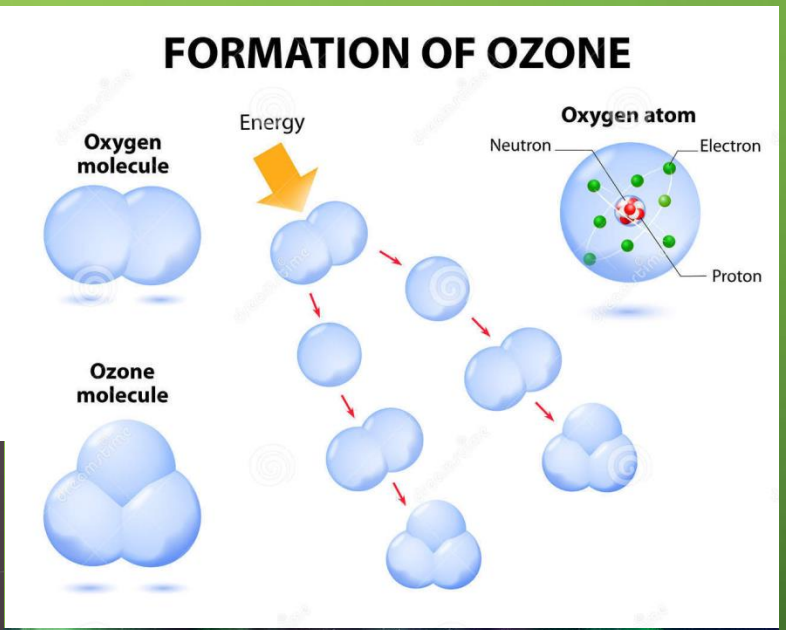
Plasma and the magnetic field

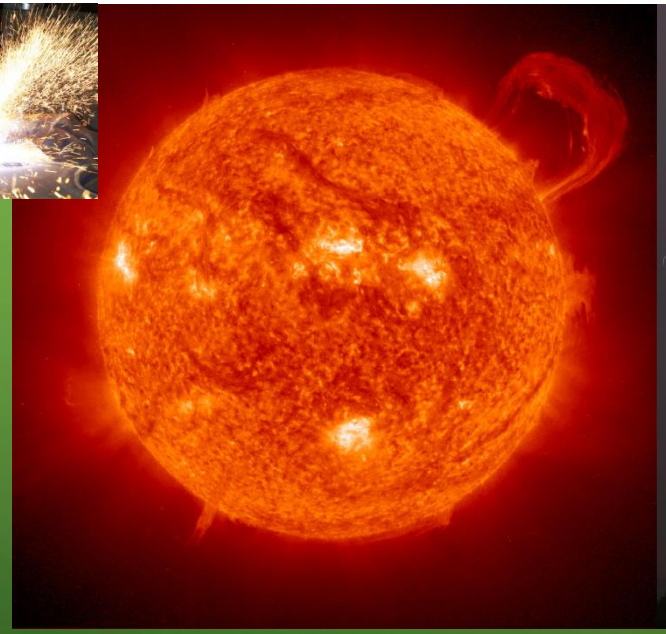




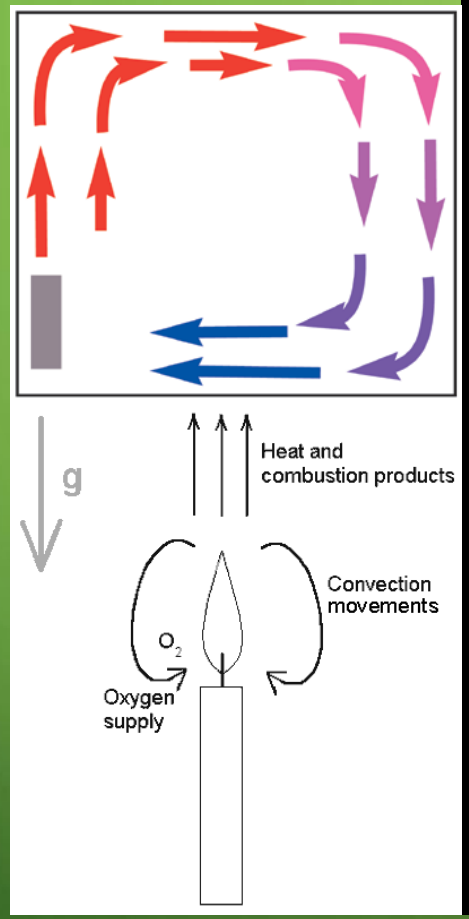
Plasma in other gases

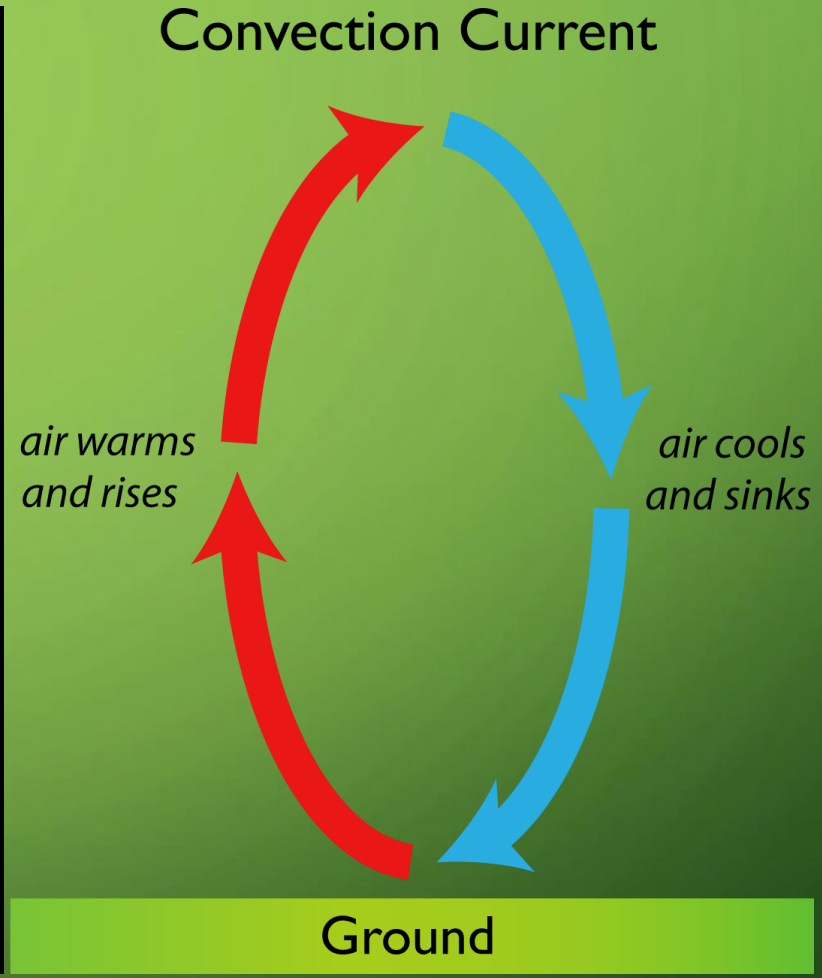




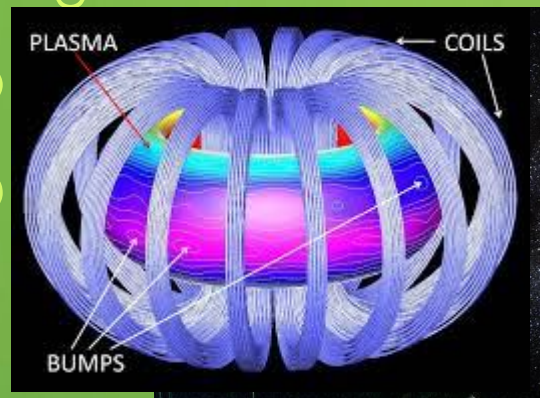


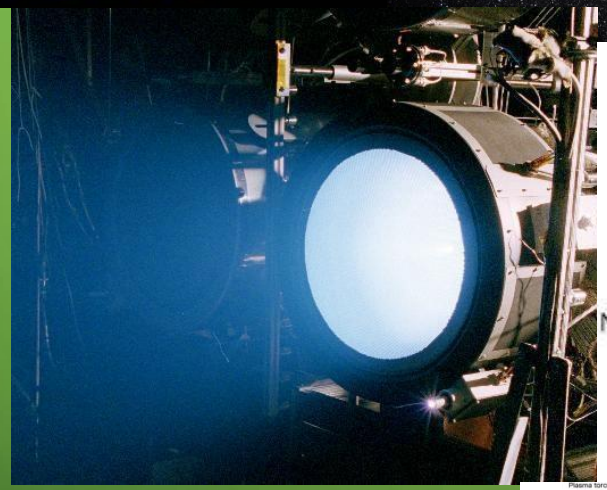
Plasma as a state of matter

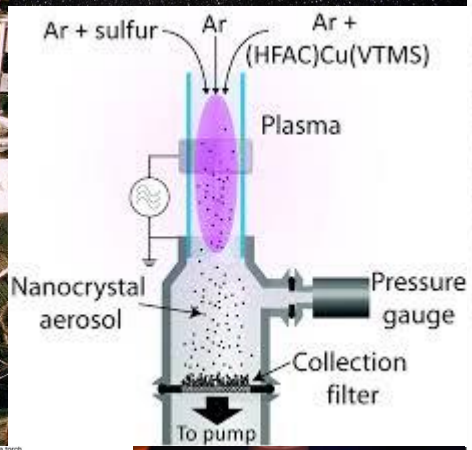


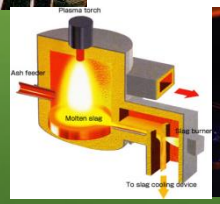


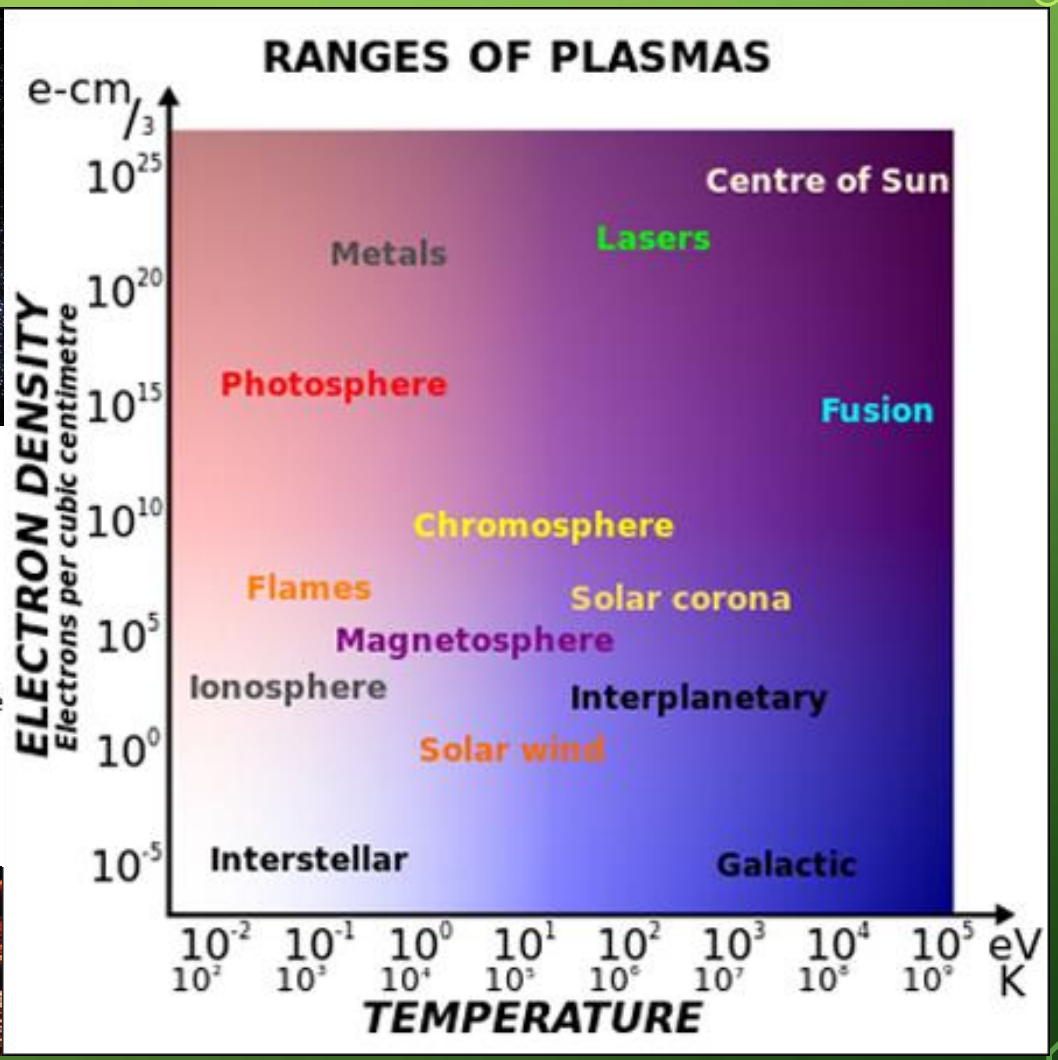
Jacob's ladder


PLASMA
COILS
BUMPS




Ar + sulfur
Ar
Ar +
(HFAC)Cu(VTMS)
Plasma
Nanocrystal
aerosol
Pressure
gauge
Collection
filter
To pump




RANGES OF PLASMAS
e-cm/3
ELECTRON DENSITY
Electrons per cubic centimetre
10^25
10^20
10^15
10^10
10^5
10^0
10^-5
Centre of Sun
Metals
Lasers
Photosphere
Fusion
Chromosphere
Flames
Solar corona
Magnetosphere
Ionosphere
Interplanetary
Solar wind
Interstellar
Galactic
10^-2 10^-1 10^0 10^1 10^2 10^3 10^4 10^5 eV
10^2 10^3 10^4 10^5 10^6 10^7 10^8 10^9 K
TEMPERATURE

Summary

Thank you for watching

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