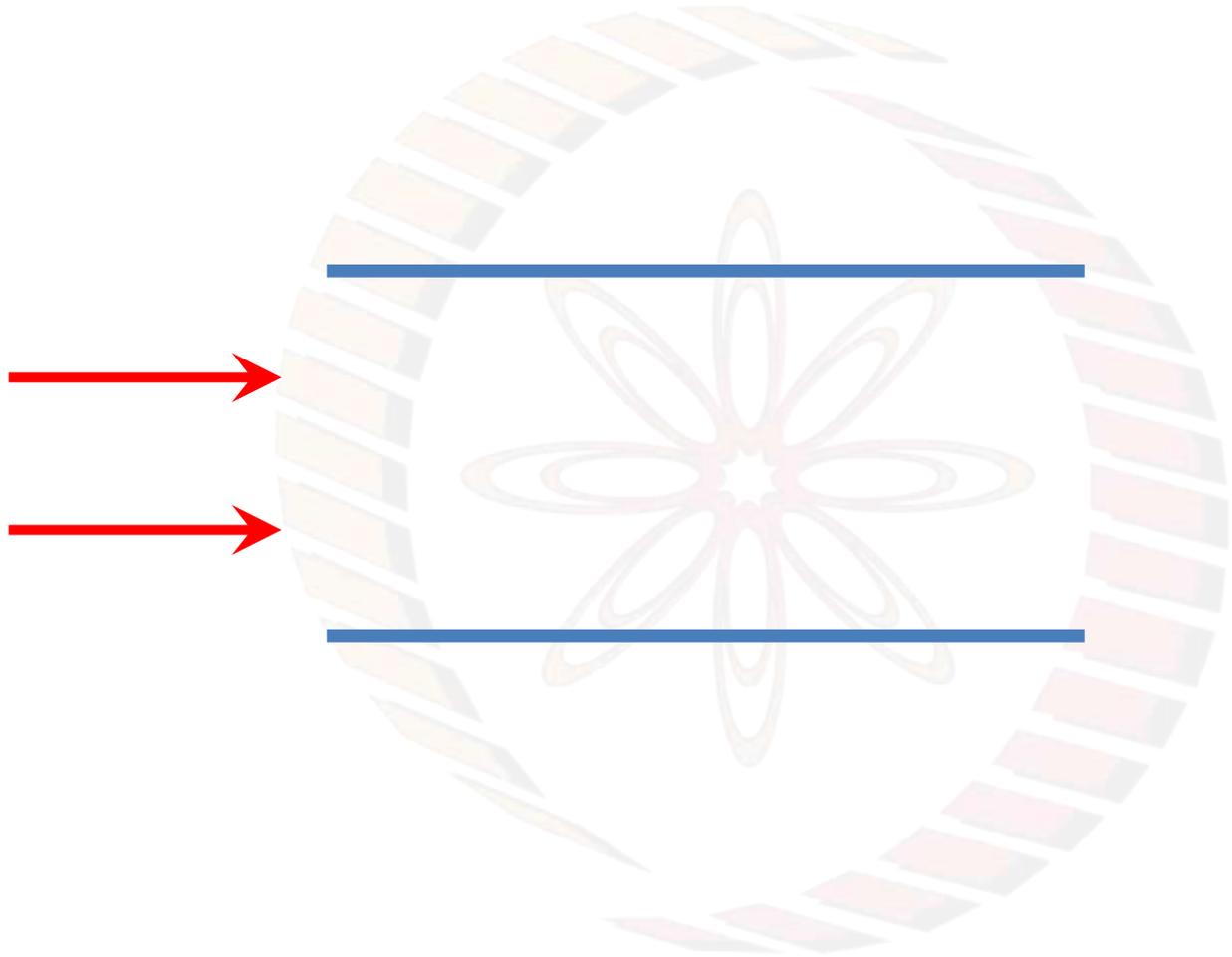




Magnetohydrodynamic Power Generation

Learning Objectives

- 1) The operating principle of Magnetohydrodynamic power generation
- 2) Indicate the different modes in which it can be implemented
- 3) Indicate the challenges posed by this technology



Thermal power plant



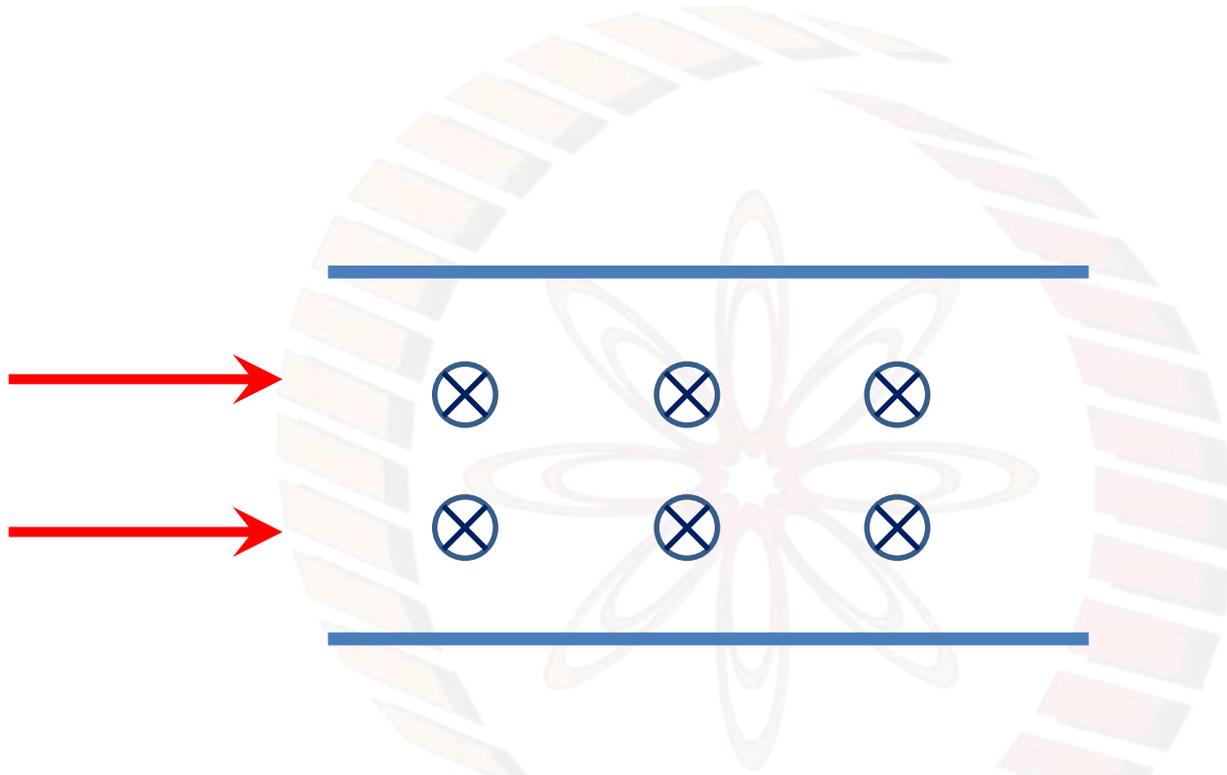
$$\eta = 1 - \frac{T_2}{T_1}$$

Combined cycle power plant

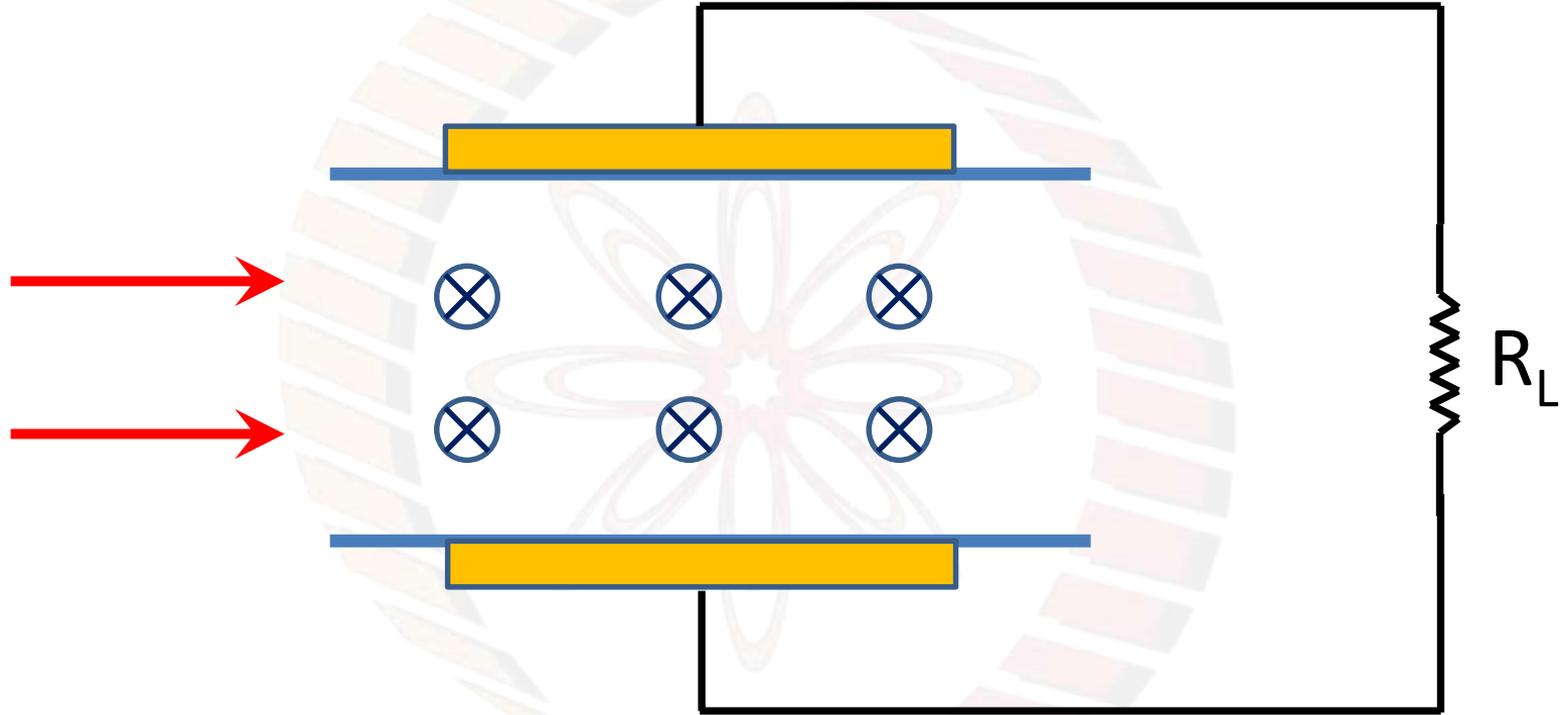


Plasma

- Fourth state of matter
- Ionized Gas
- Low ionization energy elements can be used
- Cs, K have relatively low ionization energy

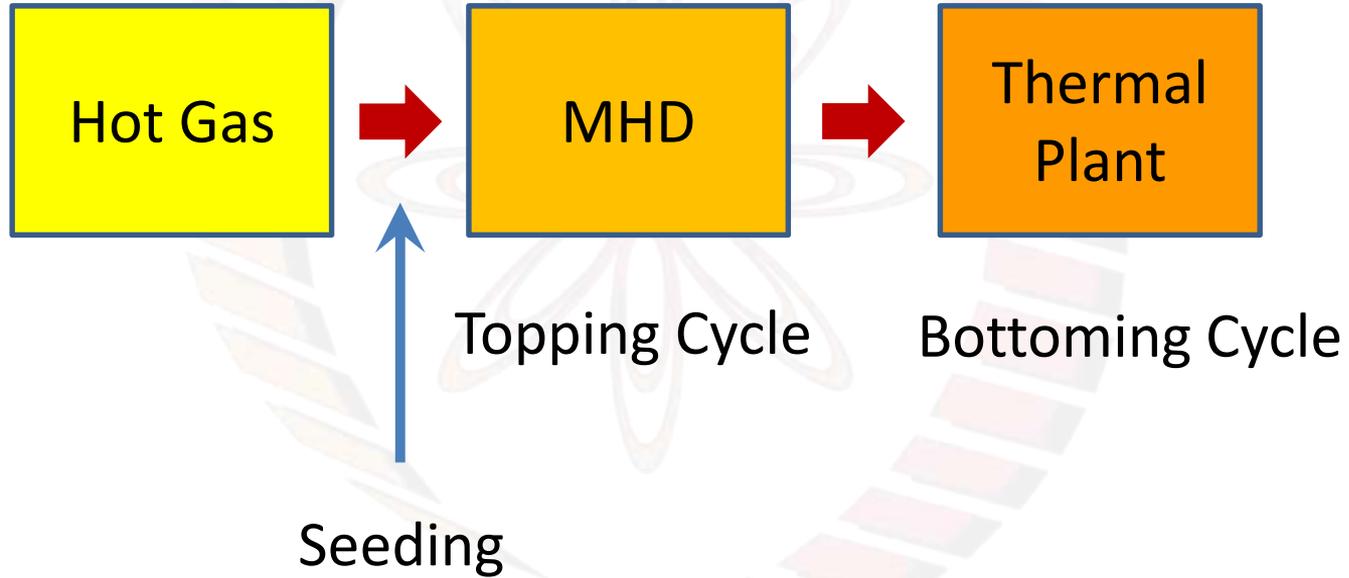


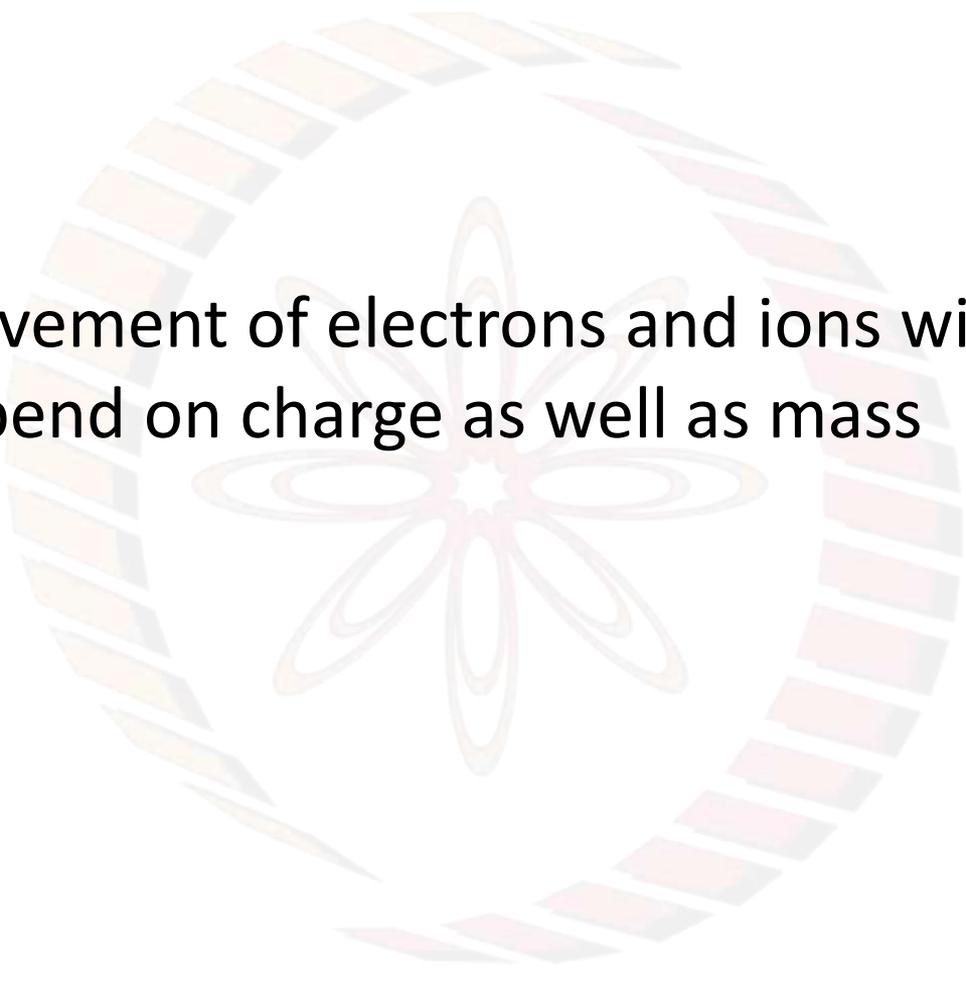
Electrons and ions deflected in opposite directions,
generating voltage



Cs and K added to the gas. The temperature should be high enough to ionize these. Called Seeding

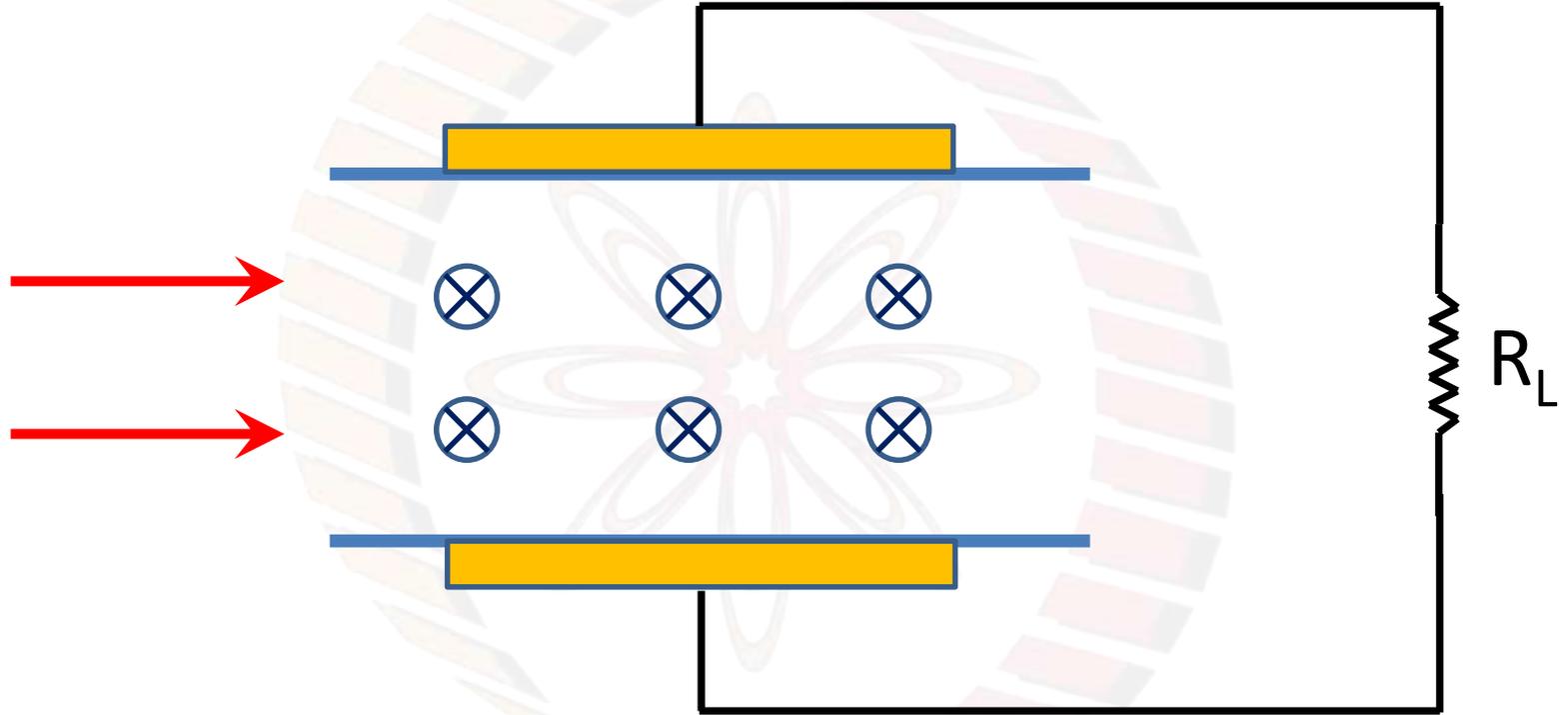
Combined cycle power plant



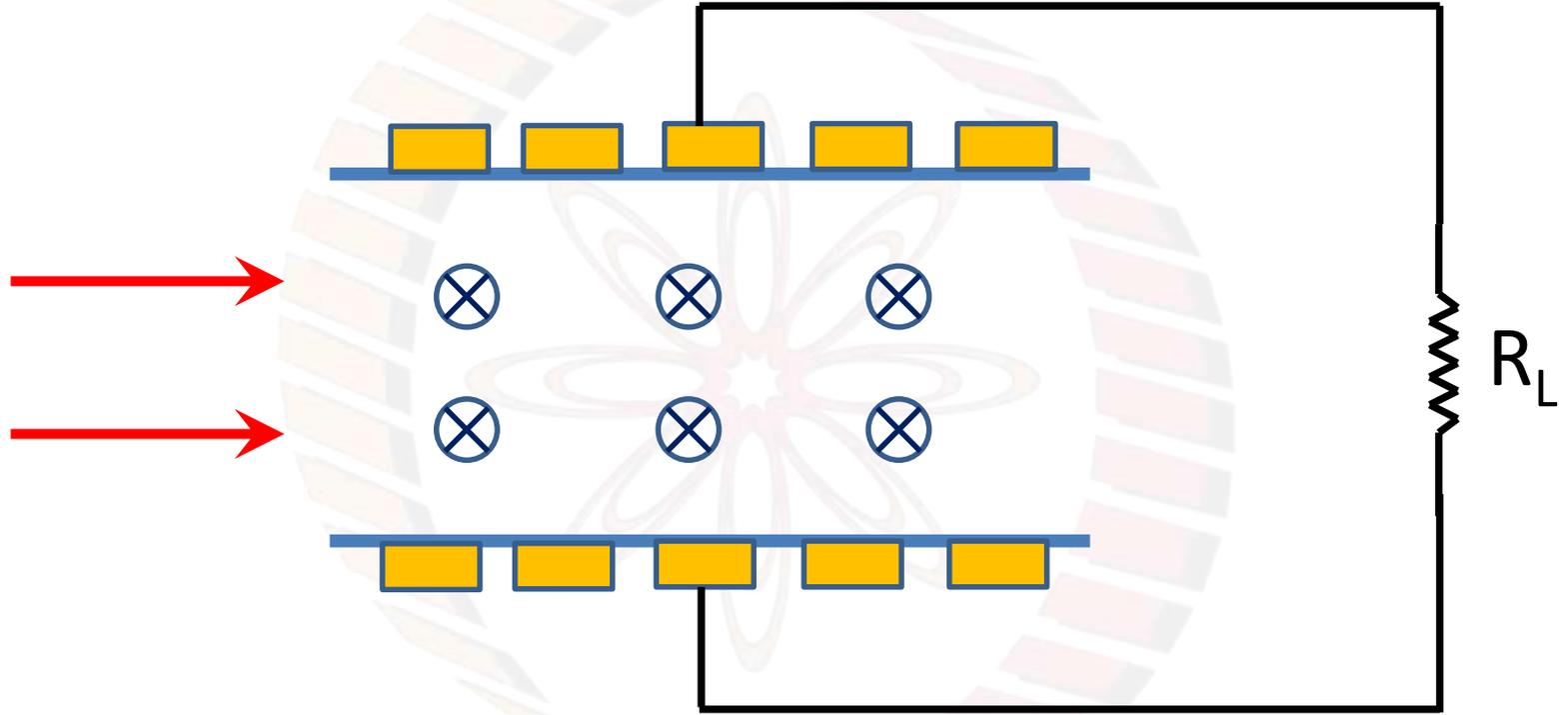


Movement of electrons and ions will depend on charge as well as mass

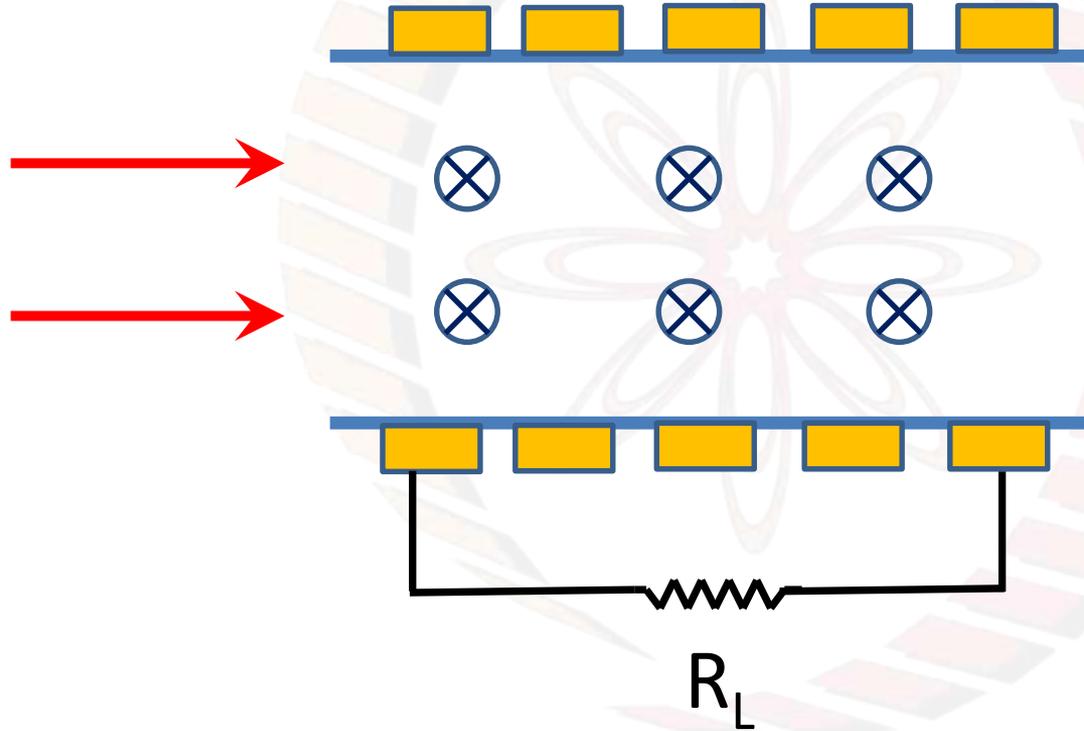
Faradaic Generator



Segmented Faraday Generator



Hall Generator



Conclusions

- 1) Magnetohydrodynamic power generation, enables generation of power from hot gases, without moving parts
- 2) It requires high temperatures
- 3) Usually combined with a regular thermal plant, but appears at the top end of the stream
- 4) Can have toxic implications based on implementation strategy

Course Summary:

- 1) Usage of energy around the world – Nation, per capita, by sector
 - 2) Impact on Environment
 - 3) Solar Energy
 - 4) Wind
 - 5) OTEC
 - 6) Geothermal
 - 7) Biomass
 - 8) Battery
 - 9) Fuel cells
 - 10) Supercapacitors
 - 11) Flywheels
 - 12) Magnetohydrodynamic power generation
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