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## **[22] Physics and Education - A Journey into Plasma Physics**

*Wednesday 11 September 2024 12:15 (45 minutes)*

More than 99% of all visible matter in the universe is in the plasma state, and plasmas are present in a wealth of interesting phenomena from astrophysics to medical physics. Yet, this is an area completely underrepresented in physics teaching at schools and in physics teacher education. In the present talk, an outlook is provided on some of the reasons why the topic of plasma is important for a “general culture” in physics (e.g., importance in applied science; “space weather,” linking life on Earth to astrophysical processes; fusion for its societal importance, etc.).

Plasma is considered as an additional state of matter next to solid, liquid, and gas. Plasma activation occurs when electrons are ripped off their atoms or molecules by receiving energy, which can be delivered by heating, electromagnetic fields, chemical reactions, or friction. Since sufficient energy is provided for ionization, numerous inelastic collisions occur to excite atoms and to dissociate molecules. A plasma thus triggers non-spontaneous chemical reactions.

While these plasma chemical reactions play a role in natural phenomena such as lightning and auroras, plasma technology provides a powerful tool to modify materials, to conduct chemical reactions at low temperature, or to use thermal plasma applications. Several examples and milestones will be demonstrated.

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