NUCLEAR FUSION AS A SOURCE OF CLEAN ENERGY

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As the world population grows, the demand for energy grows rapidly with it. Fossil fuels still provide most of the energy in the world, thus being the only source able to meet the demand. Consequently, humanity faces a number of serious problems, such as the global climate change due to the high CO_2 emission and the perspective of soon running out of fuel.

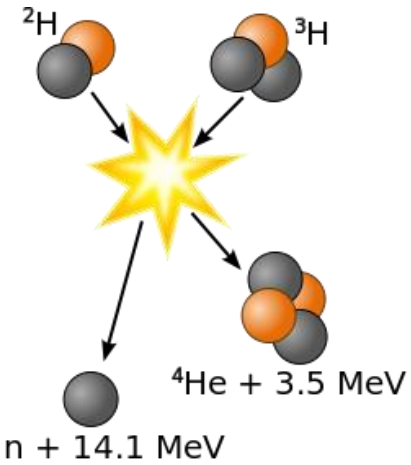

Fig.1 The fusion reaction between deuterium and tritium.

Nuclear fusion is considered to be one of the main candidates in replacing fossil fuels [1]. Fusion is the process of merging two light atomic nuclei into one that is accompanied by a release of energy. Potentially it is an inexhaustible energy source, since the fuel for a fusion reactor is produced from hydrogen, the amount of which is practically unlimited on our planet. It is estimated that a fusion power plant operating on Deuterium-Tritium (D-T) fuel (Fig. 1) would require about 250 kilograms of fuel to provide the same amount of energy as a coal-powered power plant does using 2.7 million tons of coal [2].

However, no functioning reactor able to generate electricity on a constant basis has yet been developed. This is an overview of the current fusion research situation, describing its challenges, achievements, and perspectives.

References

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