

# OBSERVATIONS ON THE CANDLE BURN-UP IN VARIOUS GEOMETRIES

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## ABSTRACT

We have looked at all geometrical conditions under which an autocatalytically propagating burn-up wave (CANDLE burn-up) is possible. Thereby, the Sine Gordon equation finds a new place in the burn-up theory of nuclear fission reactors. For a practical reactor design the axially burning „spaghetti“ reactor and the azimuthally burning „pancake“ reactor, respectively, seem to be the most promising geometries for a practical reactor design. Radial and spherical burn-waves in cylindrical and spherical geometry, respectively, are principally impossible. Also, the possible applicability of such fission burn-waves on the OKLO-phenomenon and the GEOREACTOR in the center of Earth, postulated by Herndon, is discussed.

A fast CANDLE-reactor can work with only depleted uranium. Therefore, uranium mining and uranium-enrichment are not necessary anymore. Furthermore, it is also possible to dispense with reprocessing because the uranium utilization factor is as high as about 40%. Thus, this completely new reactor type can open a new era of reactor technology.