R-PROCESS CALCULATIONS WITH A MICROSCOPIC DESCRIPTION OF THE FISSION PROCESS

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The rapid neutron capture process (*r*-process) is responsible for the production of half of the elements heavier than Iron. The quest to identify its actual astrophysical site is still ongoing, but there are strong indications that make neutron star mergers (NSM) a likely candidate. Reliable estimates of nucleosynthesis yields on NSM require an accurate description of the relevant nuclear physics inputs, including fission properties of heavy and superheavy nuclei.

We have computed the fission properties of nuclei in the range $84 \leq Z \leq 120$ and $120 \leq N \leq 250$ using the nuclear energy density functional theory (EDF) and the Barcelona-Catania-Paris-Madrid (BCPM) functional [1,2]. A new set of spontaneous, neutron-induced and beta-delayed fission rates are obtained from a microscopic calculation of the fission inputs. These fission rates are used as a nuclear input in *r*-process calculations in NSM. This constitutes a first step in a systematic exploration of different sets of fission rates on *r*-process abundance predictions.

As a further extension, the impact of a dynamic description of the fission process [3-5] in the r-process abundances as well as the implementation of several EDF's will be explored. These results will point toward an exhaustive description, within the EDF theory, of the role that fission plays in the r-process nucleosynthesis.

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