# DYNAMICAL CALCULATION OF PROTON EMISSION FROM A DEFORMED TO A SPHERICAL NUCLEUS

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July 15, 1999

In the past two decades, an appreciable amount of work, experimental as well as theoretical, has been devoted to the study of proton emitters. Despite this effort, important questions still remain open. A full time-dependent approach to the multidimensional quantum tunneling problem of a single-proton leaking through a deformed average potential has indeed been developed only recently [Talou et al., Nucl. Phys. A647, 21 (1999)]. In this method, the Time-Dependent Schrödinger Equation (TDSE) is solved numerically for initial quasi-stationary single-proton states in an average deformed (stationary) potential created by its interaction with its neighbouring nucleons. Following the proton wave function in time, one has access to dynamical quantities such as: proton decay rate, tunneling angular distribution, current density distribution, etc. Unexpected and very interesting features of the multidimensional decay process have been revealed [Carjan et al., this symposium].

Here we extend this approach to tackle the problem of proton emission from a deformed to a spherical nucleus, process that has been recently measured [Rudolph et al., PRL 80, 3018 (1998)]. Unlike stationary approaches, our time-dependent method is able to solve such a problem in which the average interacting potential varies in time.

Starting from an initial single-proton quasi-stationary state in a deformed potential, we follow its time evolution by solving numerically the TDSE. Different time-dependences of the interacting potential, from adiabatic to sudden, were chosen. The influence of the different time scales on the main observables is investigated, allowing for the first time an interpretation of the recent experimental data.

INTERNATIONAL SYMPOSIUM ON PROTON EMITTING NUCLEI
OCTOBER 7-9, 1999, OAK RIDGE, TENNESSEE