

NUCLEAR REACTION DETAILED-BALANCE TEST AND
MOLECULAR BEAMS

Đuro Miljanić
Ruder Bošković Institute, Zagreb

It was pointed out recently [1], that very accurate nuclear reaction detailed-balance test could be done by the use of molecular beams and composite targets. There is a class of nuclear reactions; which could be used in this "molecular" approach. Necessary requirement for a reaction, $a+b \rightarrow c+d$, to be in this class is:

$$\frac{Q}{m_{cd} - m_{ab}} > 0$$

(Q and m 's are the Q -value and reduced masses; respectively). The $^{13}\text{C}(d,t) ^{12}\text{C}$ reaction at present seems to be the most suitable one for this kind of test. However, recent advances in the production of HeH^+ ions from different ion sources [2] have raised the hope, that one would be able to use also (p,α) and (d,α) reactions for the same purposes. This kind of accurate experiments would hopefully give definite information whether time-reversal invariance is violated in nuclear reactions.

References:

- [1] Đ. Miljanić, to be published
- [2] G.A. Kyrala, D.A. Tolliver and W.H. Wing, Int. J. Mass Spectr. Ion. Phys. 33 (1980) 367 and references therein