



Contribution ID: 44

Type: Oral

Analysis of two-proton transfer in the $^{40}\text{Ca}(^{18}\text{O},\text{Ne})^{38}\text{Ar}$ and $^{116}\text{Cd}(^{20}\text{Ne},^{18}\text{O})^{118}\text{Sn}$ reactions

We analysed the angular distribution of two-proton pickup transfer for the $^{40}\text{Ca}(^{18}\text{O},^{20}\text{Ne})^{38}\text{Ar}$ reaction at 270 MeV incident energy. The coupled reaction channel (CRC) and coupled channel Born approximations (CCBA) methods were considered in the theoretical calculations to obtain the two-proton transfer angular distributions, in which the results have reproduced very well the experimental data. In addition, we also analysed the two-proton stripping transfer reaction corresponding to the $^{116}\text{Cd}(^{20}\text{Ne},^{18}\text{O})^{118}\text{Sn}$, at 306 MeV bombarding energy, for which the integrated cross section for the final channels $^{18}\text{O} \text{ gs}(0+) + ^{118}\text{Sn} \text{ gs}(0+)$ and $^{18}\text{O} \text{ gs}(0+) + ^{118}\text{Sn} 1.23(2+)$ were measured. The data were quite well described by the theoretical results. The one- and two-proton spectroscopic amplitudes were derived from the shell model calculations. In this work, we have discussed the role of the pairing correlations during the transfer process to populate the final channels in the present reactions. Besides, once these reactions might strongly compete with the double charge exchange reaction, like $^{40}\text{Ca}(^{18}\text{O},^{18}\text{Ne})^{40}\text{Ar}$ [1] and $^{116}\text{Cd}(^{20}\text{Ne},^{20}\text{O})^{116}\text{Sn}$ [2], is extremely important to be confident with respect to the prediction of transfer cross section mainly for many reactions for which there is no experimental information that might compete with double charge exchange reaction. This measurement of the double charge exchange cross sections for different systems is the main objective of the NUMEN project.

[1] F. Cappuzzello et al., Eur. Phys. J. A 51, 145 (2015).

[2] F. Cappuzzello et al., Eur. Phys. J. A 54, 72 (2018)

Primary author: LUBIAN RIOS, Jesus (Federal Fluminense University)

Presenter: LUBIAN RIOS, Jesus (Federal Fluminense University)

Session Classification: Contributed Talks