

QUASI-FREE SCATTERING WITH RADIOACTIVE ION BEAMS

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ORGANISERS:

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NUMBER OF PARTICIPANTS: 35

MAIN TOPICS:

- quasi-free scattering reactions with hadron and electron probes
- achievements with stable nuclei and outstanding problems
- reaction theory of quasi-free scattering reactions
- nuclear many-body theory: spectroscopic factors, spectral function and correlations
- in-medium effects in symmetric and asymmetric nuclei and nuclear matter
- quasi-free scattering with radioactive beams: status and prospects
- perspectives for a physics programme studying asymmetric nuclei and nuclear matter

SPEAKERS:

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T. Uesaka (*CNS-Tokyo, JP*),

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SCIENTIFIC REPORT:

Aim and Purpose: The workshop brought together experts working in the field of quasi-free scattering using both proton and electron beams on stable nuclei with those who wish to apply the quasi-free scattering techniques using radioactive beams. The main purpose of the workshop was to review the experimental and theoretical status of the physics studied with quasi-free knockout reactions, including the reaction theory, aiming at a critical assessment on the potential of applying this techniques to investigate properties of neutron-proton asymmetric nuclei and nuclear matter.

Results and Highlights: The workshop format was designed to allow maximum interaction, discussion and questioning. Discussion leaders played an excellent role in staging their presentations to this instruction. The different experimental methods for studying quasifree knockout reactions were presented and discussed. The reaction theory describing the knockout process have been reviewed as well as the different physics topics accessible by knockout reactions, e.g., single-particle structure, long and short-range correlations, as well as in-medium effects. First results from experiments utilizing radioactive beams have been presented as well. The applicability to radioactive beam experiments has been discussed and a possible experimental programme was identified.

Conclusions: The workshop has shown that quasifree scattering experiments with radioactive beams have a large scientific potential. A critical discussion of the various aspects lead to the conclusion that the experimental techniques proposed are appropriate and that the precision one will reach will allow a detailed investigation of the single-particle structure of nuclei, long-range correlations, as well as in-medium effects of the nucleon-nucleon interaction as a function of neutron-proton asymmetry. The developments of reaction theory is of outmost importance for a quantitative analysis and understanding of the data.

Presentations: All presentations from the 25 discussion leaders (minus the associated and extensive discussion) and the full Workshop details are available on the QFS website:

<http://www.nucleartheory.net/QFS/presentations.htm>

Given the open nature of the workshop, including the sharing of many new (and yet unpublished) results, these presentations have in some cases been edited by the authors prior to their posting on this public website.