

## The Polarized Deuteron Break-up Experiment at COSY

S. Dymov<sup>1, #</sup>, R. Engels<sup>2</sup>, A. Kacharava<sup>3</sup>, H. Kleines<sup>4</sup>, V. Komarov<sup>5</sup>, P. Kravtsov<sup>6</sup>,  
A. Kulikov<sup>5</sup>, A. Kurbatov<sup>5</sup>, B. Lorentz<sup>1</sup>, G. Macharashvili<sup>5</sup>, M. Mikirtyehiants<sup>1, †</sup>, V. Nelyubin<sup>6</sup>,  
D. Prasulan<sup>1</sup>, F. Rathmann<sup>1</sup>, J. Sarkadi<sup>4</sup>, H. Seyfarth<sup>1</sup>, H. Paetz gen. Schieck<sup>2</sup>, E. Steffens<sup>3</sup>,  
H. Stroher<sup>1</sup>, Yu. Uzikov<sup>5</sup>, A. Vassiliev<sup>6</sup>, S. Yaschenko<sup>3</sup>, B. Zalikhanov<sup>5</sup>, and K. Zvoll<sup>4</sup>  
(for the ANKE Collaboration)\*

<sup>1</sup> Institut für Kernphysik 11, Forschungszentrum Jülich, 52425 Jülich, Germany

<sup>2</sup> Institut für Kernphysik, Universität zu Köln, 50937 Köln, Germany

<sup>3</sup> Physikalisches Institut 11, Universität Erlangen-Nürnberg, 91058 Erlangen, Germany

<sup>4</sup> Zentrallabor für Elektronik, Forschungs- zentrum Jülich, 52425 Jülich, Germany

<sup>5</sup> Laboratory of Nuclear Problems, Joint Institute for Nuclear Research, 141980 Dubna, Russia

<sup>6</sup> High Energy Physics Department, St. Petersburg Nuclear Physics Institute, 188350 Gatchina, Russia

# PhD student from State Technical University St. Petersburg and PNPI Gatchina

\* for a list of collaborators, see <http://www.fz-juelich.de/ikp/anke>

In order to carry out nucleon-nucleon interaction studies with polarized beams and targets at COSY/Jülich our group is currently developing a polarized internal storage cell gas target. The target will be implemented at the magnetic spectrometer ANKE. The atomic beam source that will be utilized to feed the storage cell with either vectorpolarized hydrogen and vector- or tensorpolarized deuterium gas is performing well. For two injected hyperfine states of hydrogen a flow of  $7.4 \times 10^{16}$  atoms/s has been measured with a compression tube of 10 mm diameter, 100 mm length, located 300 mm behind the exit of the last sextupole magnet. In particular the measurement of the polarization of a deuterium target poses difficulties, since nuclear reactions involving deuterons have not yet been measured well enough in the COSY energy range. Therefore our group is currently setting up a Lamb-shift target polarimeter, which will allow for a determination of the target polarization concurrent with data taking.

In a first step, unpolarized measurements of the cross section of the deuteron break-up reaction  $pd \rightarrow ppn$  in collinear kinematics with detection of a proton pair near  $0^\circ$  have been carried out. Proton pairs from the break-up reaction with a relative energy  $T_{pp} < 3$  MeV have been detected to ensure the experiment is feasible. In addition, a first attempt has been made to measure the analyzing power  $A_y^p$  of this reaction in a polarized  $\gamma$  beam experiment. The presentation will give an overview about all aspects of the polarized deuteron break-up experiment at ANKE.

Email: [frathmann@fz-juelich.de](mailto:frathmann@fz-juelich.de)