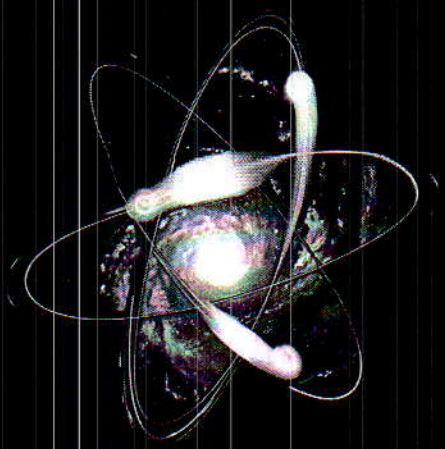
Abstract Book



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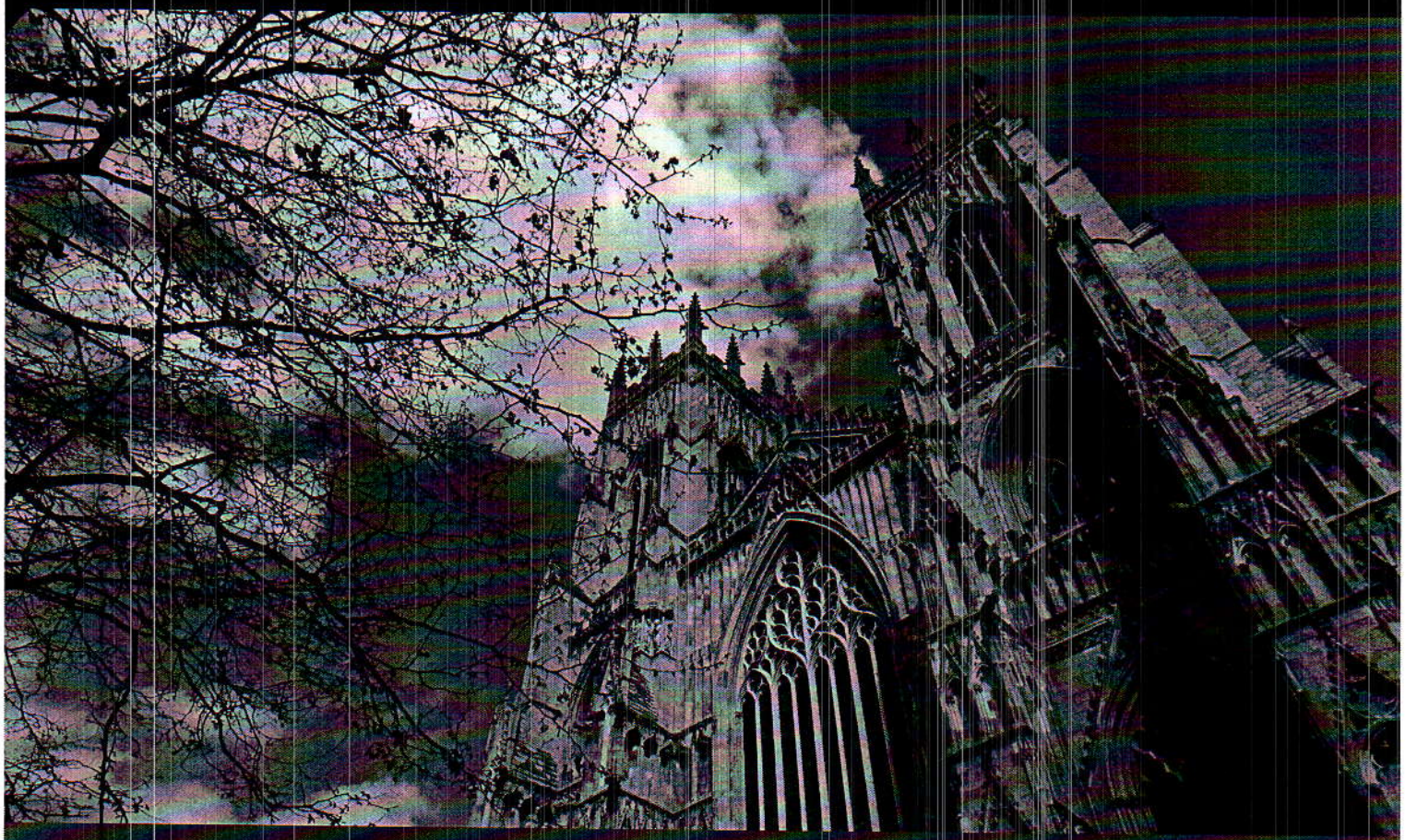

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results and future work.

[1] S. Mosby et al, Nucl.Phys. A 909, 69-78 (2013)
[2] L. Gaudefroy, W. Mittig, et al, Phys.Rev.Lett. 109, 202503 (2012)

P:34 Investigation of α-particle scattering from ^{13}C at energy 29 MeV

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In the earlier work [1] the results of experimental and theoretical studies for the elastic and inelastic scattering of α-particles from ^{13}C target nuclei in a wide energy range, including the new experimental data obtained from the cyclotron JYFL Jyvaskyla (Finland) at energy 65 MeV are presented. Theoretical analysis of the angular distributions for $\alpha+^{13}C$ inelastic scattering: $1/2^-$ (8.86 MeV) and $1/2^+$ (3.09 MeV) ^{13}C excited states performed in the framework of the distorted wave method and the modified diffraction pattern showed a significant increase in the radius for these excited states in comparison with the value obtained for the ground state. In the current work we continue the investigation of the nature of ^{13}C excited states at low energies.

The experimental angular distributions measurements for the elastic and inelastic scattering of α-particles from ^{13}C target nuclei were performed in the isochronous cyclotron U-150M located in Institute of Nuclear Physics (INP NNC RK) using an accelerated α-particles beam of an energy 29 MeV.

Angular distributions of α-particles elastically and inelastically scattered from ^{13}C nuclei at energy E_{lab}=29 MeV: ground state (0.0 MeV), $1/2^-$ (8.86 MeV) and $1/2^+$ (3.09 MeV) were measured in the angular range $\theta_{lab.}$ = 10° – 80° with increments of 1° – 2°. Energy resolution of the detector at small angles is ~290 keV, and at large angles is ~350 keV. The experimental data at this energy showed a well-developed diffraction scattering pattern.

In addition to our experimental data at E_{lab}=29 MeV, $\alpha+^{13}C$ elastic scattering was analyzed at different energies from literature; 65 MeV [1], 54.1 and 48.7 MeV [2], 35 MeV [3] and 26.6 MeV [4]. The theoretical predictions were performed using both empirical Woods-Saxon and double folding optical model potentials. The comparison between the experimental data and the theoretical predictions is fairly good overall the whole angular range. We managed from obtaining physically reasonable parameters for the interaction potentials. Analysis of inelastic scattering data were performed using the obtained optimal potential parameters and the nuclear rotational model was used to include the transition to the concerned excited state.

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[3] Артемов С.В., Ким Г., Радюк Г.А. // Изв. РАН, сер.физ, т.65, № 11, стр. 1579-1581, 2001
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