

Photoionization cross section of the first excited state of lithium

Saakyan S A^{1,®}, Klimov S V^{1,2}, Galstyan K P^{1,3},
Sautenkov V A¹ and Zelener B B^{1,3}

¹ Joint Institute for High Temperatures of the Russian Academy of Sciences, Izhorskaya 13 Bldg 2, Moscow 125412, Russia

² Moscow Institute of Physics and Technology, Institutskiy Pereulok 9, Dolgoprudny, Moscow Region 141701, Russia

³ National Research Nuclear University MEPhI (Moscow Engineering Physics Institute), Kashirskoe Shosse 31, Moscow 115409, Russia

® saasear@gmail.com

The photoionization (PI) cross sections of $2P_{3/2}$ excited state of lithium was measured in a magneto-optical trap (MOT) using a set of UV-light-emitting diodes with various wavelengths. The experiments have been conducted using a set of fiber-coupled LED with wavelength ranged from 258 to 345 nm. The experimental technique presented in [1] allows us to measure PI cross section with sufficiently better accuracy in comparison with previous measurements.

The PI cross section measured in MOT are depend on the PI beam polarization. Such polarization-dependent behavior is the evidence of some asymmetry in magnetic sublevel population [2–4]. The location of the atomic cloud in the magnetic field gradient is slightly affected by the small imbalance of the MOT beam intensity. In contrast to polarized light sources such as lasers, LEDs have random polarization, and the influence of population asymmetry of the magnetic sublevels can be significantly reduced.

This work is supported by the Russian Science Foundation under Grant No. 21-72-00011.

- [1] Saakyan S A, Vilshanskaya E V, Galstyan K P, Sautenkov V A and Zelener B B 2021 *Meas. Sci. Technol.* **32** 115501
- [2] Smith A V, Goldsmith J E M, Nitz D E and Smith S J 1980 *Phys. rev. A* **22** 577
- [3] Gabbanini C, Ceccherini F, Gozzini S and Lucchesini A 1998 *J. Phys. B: At. Mol. Opt. Phys.* **31** 4143
- [4] Saakyan S A, Sautenkov V A and Zelener B B 2021 *J. Russ. Laser Res.* **42** 545–553