

Abstract Submitted  
for the DAMOP18 Meeting of  
The American Physical Society

**Precision laser spectroscopy of the  $2^3S - 2^3P$  transition of  $^4\text{He}$**   
XIN ZHENG, YU ROBERT SUN, JIAOJIAO CHEN, SHUIMING HU, University  
of Science and Tech of China — The fine-structure splitting of the  $2^3P_J$  levels of  $^4\text{He}$   
is of great interest for tests of quantum electrodynamics and for the determination  
of the fine structure constant  $\alpha$ . The  $2^3S - 2^3P$  transition absolute frequency, when  
combined with the point-like nucleus theoretical calculations, may provide accurate  
determination of the helium nuclear charge radius. Here we report our recent studies  
on the fine-structure splitting intervals, as well as the absolute frequency of the  
 $2^3S - 2^3P$  transitions. Laser spectroscopy was performed via  $2^3P_J - 2^3S_1$  transitions  
at 1083nm. The  $2^3P_0 - 2^3P_2$  and  $2^3P_1 - 2^3P_2$  intervals were determined to be 31 908  
130.98(13) kHz and 2 291 177.56(19) kHz, respectively. Both intervals showed good  
agreements with the latest theoretical calculations. The absolute frequency of the  
 $2^3S - 2^3P$  centroid transition was measured with a relative accuracy of  $5 \times 10^{-12}$ .

Xin Zheng  
University of Science and Tech of China

Date submitted: 26 Feb 2018

Electronic form version 1.4