

Design and Functional Testing of Cesium Atomic Concentration Detection System Based on TDLAS

LZ. Liang¹, SH. Liu^{1,2}, ZY. Song^{1,3}, Y. Wu^{1,4}, JL. Wei¹, YJ. Xu¹, YH. Xie¹, YL. Xie¹, and CD. Hu¹

¹Hefei Institutes of Physical Science, Chinese Academy of Sciences,
Hefei, 230031, China

²School of Science, Shandong Jianzhu University,
Jinan, 250101, China

³Institute of Physical Science and Information Technology, Anhui University,
Hefei, 230601, China

⁴School of Electronic and Information Engineering, Anhui Jianzhu University,
Hefei, 230601, China

In order to better build the Neutral Beam Injector with Negative Ion Source (NNBI), the pre-research on key technologies has been carried out for the Comprehensive Research Facility for Fusion Technology (CRAFT). Cesium seeding into negative-ion sources is a prerequisite to obtain the required negative hydrogen ion. The performance of ion source largely depends on the cesium conditions in the source. It is very necessary to quantitatively measure the amount of cesium in the source during the plasma on and off periods (vacuum stage). This article uses the absorption peak of cesium atoms near 852.1nm to build a cesium atom concentration detection system based on Tunable Diode Laser Absorption Spectroscopy (TDLAS) technology. The test experiment based on the cesium cell is carried out, obtained the variation curve of cesium concentration at different temperatures. The experimental results indicate that: the system detection range is within 5×10^6 - 2.5×10^7 pieces/cm³ and the system resolution better than 1×10^6 pieces/cm³.

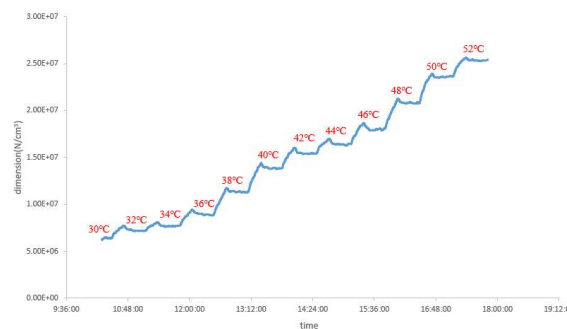


Figure 1. Trend chart of cesium concentration changing with cesium cell temperature.

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*Presenting author: lzliang@ipp.ac.cn