

Abstract Submitted  
for the DFD17 Meeting of  
The American Physical Society

**Thermoviscous analysis of open photoacoustic cells<sup>1</sup>** MADHUSOODANAN MANNOOR, SANGMO KANG, Dong-A University — Open photoacoustic cells, apart from the conventional spectroscopic applications, are increasingly useful in bio medical applications such as in vivo blood sugar measurement. Maximising the acoustic pressure amplitude and the quality factor are major design considerations associated with open cells. Conventionally, resonant photoacoustic cells are analyzed by either transmission line analogy or Eigen mode expansion method. In this study, we conducted a more comprehensive thermo viscous analysis of open photoacoustic cells. A Helmholtz cell and a T-shaped cell, which are acoustically different, are considered for analysis. Effect of geometrical dimensions on the acoustic pressure, quality factor and the intrusion of noise are analyzed and compared between these cells. Specific attention is given to the sizing of the opening and fixtures on it to minimize the radiational losses and the intrusion of noise. Our results are useful for proper selection of the type of open photoacoustic cells for in vivo blood sugar measurement and the optimization of geometric variables of such cells.

<sup>1</sup>This research was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Science, ICT and future planning (2017R1A2B4005006)

Madhusoodanan Mannoor  
Dong-A University

Date submitted: 01 Aug 2017

Electronic form version 1.4