

Functionalization of micro-fabricated alkali vapor cell arrays

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Alkali vapour cells are a key component of optically pumped magnetometers (OPMs). Those vapour cells can be fabricated as a glass-silicon-glass sandwich. For this fabrication anodic bonding is utilised. Advantages are for example wafer-scale mass-fabrication or uniform properties and geometry. The main advantage, however, is the compatibility with thin-film technology. This allows us to implement heating circuits, resistive temperature sensors, anti-reflection coatings and other elements on-chip (see Fig 1). Usually anodic bonding is the final fabrication step. Therefore, every element implemented on the OPM cell needs to be designed in compatibility with elevated temperature, high voltage and ion drift appearing in the anodic bonding step. We analyse the impact of anodic bonding on wafer stacks of alkali vapour cells featuring functionalized surfaces. We will focus on structured thin-films of AuPd used as a material for electrical resistive heaters.

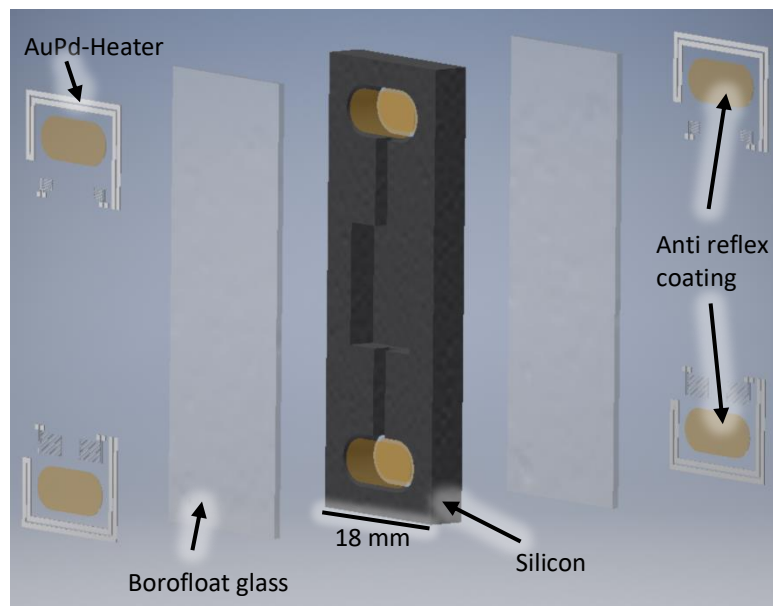


Figure 1: Explosion view of an alkali vapor cell array for gradiometric measurement featuring electrical heating elements and anti-reflection coatings.