# Calibration System Based on Carbon Nanotube Fibers for Multispectral Optoacoustic Imaging

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Optoacoustic (OA) imaging is becoming one of the leading visualization systems which is approved for use in clinical setting as an effective tool for early diagnostics and disease prognosis for patients suffering from cancer. Non-invasive, rapid, and absolutely safe technique allows to get high-resolution images of living tissues that are essential for correct diagnosis and further treatment procedures of a variety of diseases. In regular laboratory practices OA visualization is also applied in a daily regimen. Still, there is no any standardized approach for OA equipment resolution verification that is strictly required for tests reliability. As a solution for this issue, we manufactured a calibration grid (CG) based on carbon nanotube fibers (CNTFs) which is able to resolve both a small number of and several hundreds micrometers. We tested different designs of CNTFs to find the best one for CG manufacturing. Thus, we have chosen an optimal length, diameter and architecture of CNTFs (twisted/untwisted) for creation of a reliable, time-stable grid for OA equipment calibration. Summing up, the present study is the first demonstration of a CG which is able to check resolution in X, Y, and Z directions. In addition, carbon nanotubes absorb light in a broad range, so a grid based on CNTFs is also applicable in multispectral systems which is an enormous advantage. The presented prototype of a CG is a novel tool for a rapid resolution monitoring that is a crucial factor for a daily use both in scientific laboratories and in clinics.