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## **A non-contact Photoacoustic Tomography reconstruction procedure. Requirements for data processing algorithms.**

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A non-contact Photoacoustic Tomography (PAT) is relatively new imaging method with penetration depth up to few centimeters. It measures a tissue surface displacement instead of the pressure in contact PAT. According to the same physical fundamentals, all algorithms of the contact PAT may be implemented for the non-contact PAT. It is only necessary to develop the approach of recalculation the acoustic wave pressure to the surface displacement and vice versa. An approach of calculating the displacement  $\xi$  based on the acoustic pressure on the surface  $p$  is developed in [1].

The quality of the obtained result is worsened by the speckle noise [2] and model error. As result, the contrast and resolution of the reconstructed image are decreased. Requirements for a noise filter according to features of experimental data are discussed. An appropriate method of the speckle noise elimination is proposed. The tissue parameters estimation approach is developed. The quality parameters of the reconstructed image are calculated.

- [1] A Problem of a Displacement Calculation of Tissue Surface in Non-Contact Photoacoustic Tomography / I.Verbytskyi, M. Münter, C. Buj, R. Brinkmann // *Nauk. Visti NTUU KPI*, No 2, 2017, Pp. 5864.
- [2] K. Thangavel, R. Manavalan, Laurence Aroquiaraj, Removal of Speckle Noise from Ultrasound Medical Image based on Special Filters: Comarative study, *ICGST-GVIP Journal*, Vol. 9, Issue:3, pp. 25-32, June 2009.