

Abstract Submitted
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Atomic force microscopy as nano-stethoscope to study living organisms, insects IGOR SOKOLOV, MAXIM DOKUKIN, NATALIYA GUZ, Clarkson University — Atomic force microscopy (AFM) is a known method to study various surfaces. Here we report on the use of AFM to study surface oscillations (coming from the work of internal organs) of living organisms, like insects. As an example, ladybird beetles (*Hippodamia convergens*) measured in different parts of the insect at picometer level. This allows us to record a much broader spectral range of possible surface vibrations (up to several kHz) than the previously studied oscillations due to breathing, heartbeat cycles, coelopulses, etc. (up to 5 -10 Hz). The used here AFM method allows collecting signal from the area as small as $\sim 100\text{nm}^2$ ($0.0001\mu\text{m}^2$) with an example of noise level of $(2\pm 0.2)\times 10^{-3}$ nm r.m.s. at the range of frequencies $>50\text{Hz}$ (potentially, up to a MHz). Application of this method to humans is discussed. The method, being a relatively non-invasive technique providing a new type of information, may be useful in developing of what could be called “nanophysiology.”

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