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**Nonlinear physics in bubble 'buku-buku' process with application to quasi-periodic volcanic eruptions**

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To mimic in the laboratory the acoustic phenomena due to bubbles rising in magma, we have investigated sounds produced by successive bubbles rising through fluid in a container. In a viscous Newtonian fluid, most of the bubbles were silent, while in the non-newtonian fluid all bubbles except the first one generated sound wave at their bursting on the fluid surface. We observed a modulation pattern of the acoustic waveform through time. Moreover, we found the existence of a precursor acoustic signal previous to each bursting. The time delay between this precursor and the bursting signal is well correlated with the bursting signal frequency content. Their joint modulation through time is driven by the memory of previous bubbles, especially the presence of small satellite bubbles trapped in the fluid due to the yield stress. At volcanoes, repetitive acoustic signals with modulation are often observed as seismic or atmospheric waves, which have been interpreted as a result of changes of the system parameters. Our experimental results have pointed out a new possibility that the non-Newtonian nature of magma with its memory effect spontaneously generates such modulations.