Supplementary Material: Exploring extreme thermodynamics in nanoliter volumes through stimulated Brillouin-Mandelstam scattering

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I. GAIN MEASUREMENT

In the stimulated regime, the Stokes component of Brillouin scattering follows the exponential behavior $P_{\mathrm{Peak}} \propto \exp(G \cdot P_{\mathrm{R}})$, with G being the Brillouin gain and $P_{\mathrm{R}} = L \cdot R_{\mathrm{P}}$ being the reduced power. Here $L = (2.00 \pm 0.05)\,\mathrm{m}$ is the length of the capillary and $R_{\mathrm{P}} = 0.03$ is the duty cycle of the used pump pulses with a repetition rate of 1 MHz. Considering the reduced power instead of the average input power removes the dependence of the gain on experimental parameters, such as the length of the sample and the used pump scheme. Only data points above a threshold, where the Brillouin intensity start to rise exponentially, are considered for the fitting. The data point around 1.0 W m is lower as we were running into the saturation of the photo diode before introducing an optical attenuator to measure higher pump powers. A similar behavior is observed around 1.5 W m.

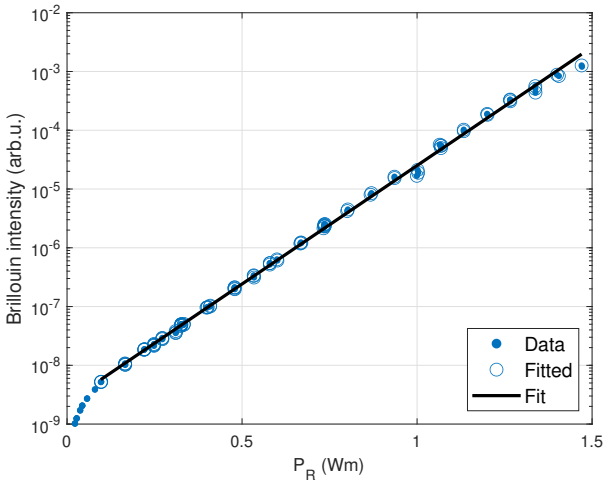

FIG. 1. Measured Brillouin intensity over average pump power on logarithmic scale. Stimulated Brillouin scattering increases exponentially with the pump power. Exponential model fitted. Encircled data points are in the stimulated regime and therefore used for the fit.

II. TEMPERATURE-PRESSURE DIAGRAM

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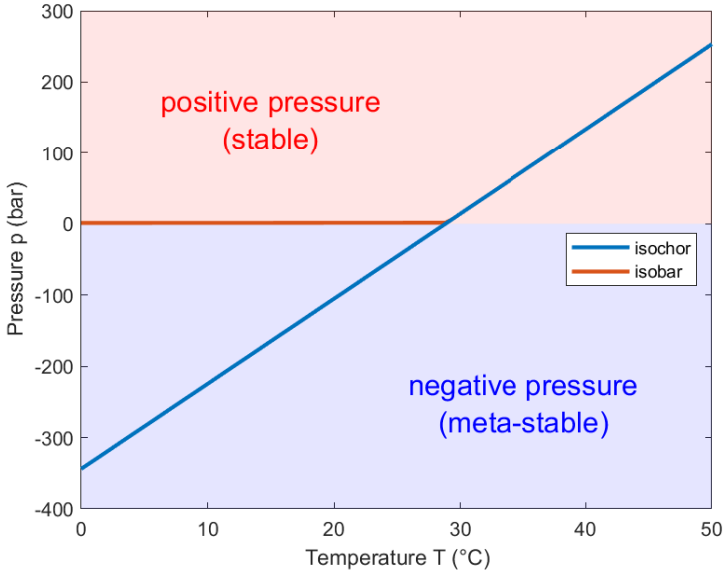

FIG. 2. Illustration of the isobaric and isochoric regime in the temperature-pressure diagram for a fully tempered fiber, that is 99 %-filled at room temperature. In the isobaric regime, only the CS_2 vapour pressure is considered, which is neglectable compared to the pressure in the isochoric state.