

Supplementary Materials: Photoconductivity in Polar and Nonpolar Cuts of Undoped $\text{Sr}_{0.61}\text{Ba}_{0.39}\text{Nb}_2\text{O}_6$ Single Crystals

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1. Daylight response of z-cut SBN61

In figure S1 the pronounced photosensitivity of SBN already under daylight is illustrated.

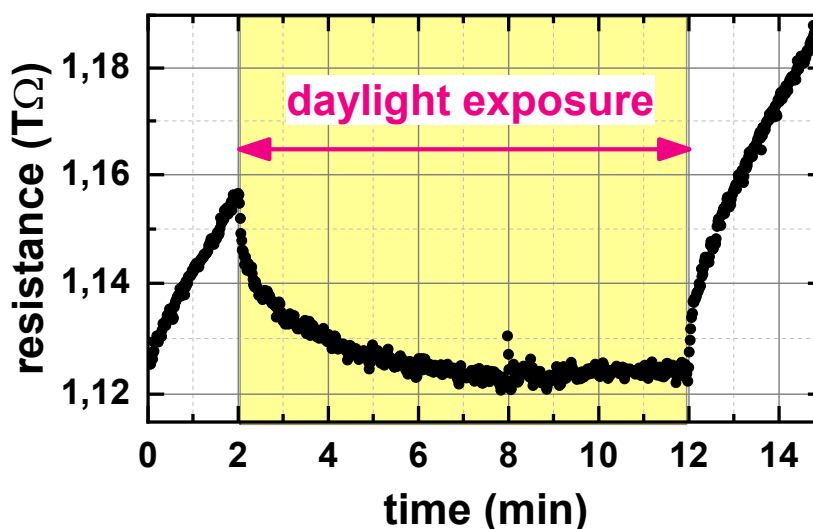


Figure S1. Pronounced photoconductive effect triggered already by diffuse daylight: Resistance vs. time shortly after mounting the z-cut SBN61 crystal in the measurement device. While the sample is shadowed between 0 and 2 minutes and again after 12 minutes, it is exposed to normal laboratory day light between minutes 2 and 12 (indicated by yellowish background). During this period of time a clear resistance decrease occurs. The continuous resistance increase during the shadowed periods is due to slow relaxation of photoinduced charge carriers, as investigated in more detail in the following.

2. Electrical-contact geometries

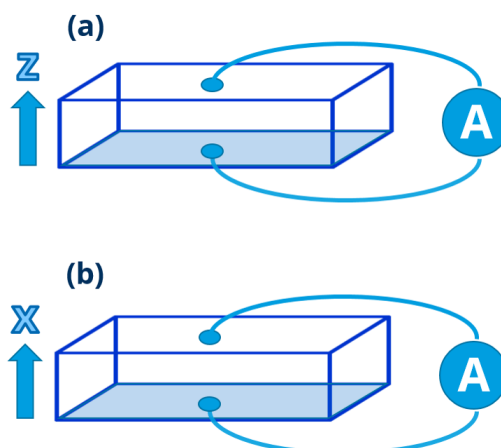


Figure S2. Illustration of the sample contacting: While the (illuminated) surface is contacted by a conducting silver dot, the rear side is fully covered by the silver paste. The current is measured in 2-wire geometry, the current spread within the sample can be expected to be cone-like.

3. Linear representation of photoconductivity spectra

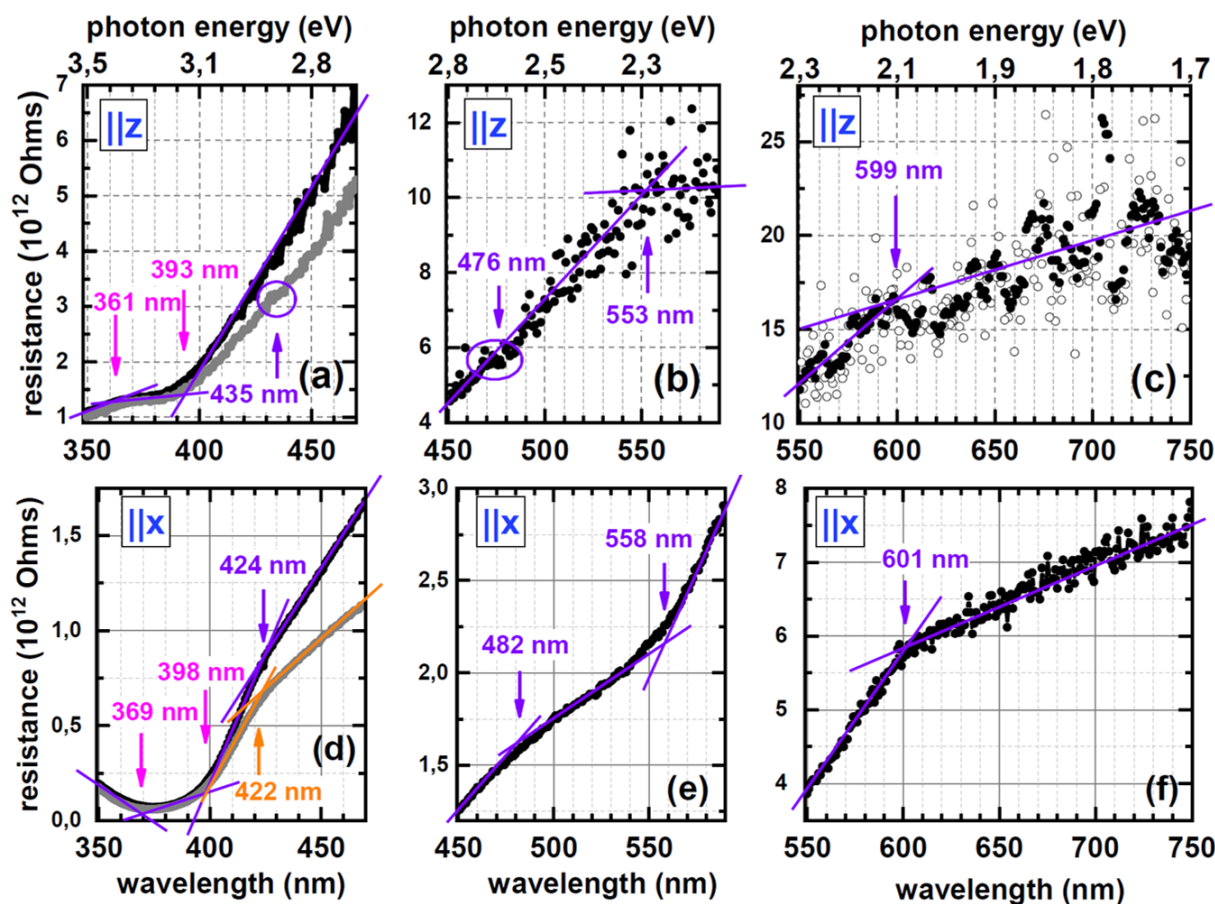


Figure S3. Photoconductivity spectra – comparative linear plots with spectral features: While subfigures (a), (b), (c) show the wavelength dependence of the resistance measured along the polar axis (z-cut sample), the subfigures (d), (e), (f) depict the corresponding data recorded for the x-cut sample. The data was acquired within three overlapping partial spectra beginning at the high-wavelength end in all cases. Points of slope change or discontinuities in the form of small plateaus are indicated by arrows. For the subspectra (a) and (d) the two different curves (black vs. grey) demonstrate the degree of reproducibility; for case (c) a smoothed curve (filled circles) is shown alongside with the quite scattering original data (open circles).

4. Dark current-voltage characteristics of z-cut SBN61

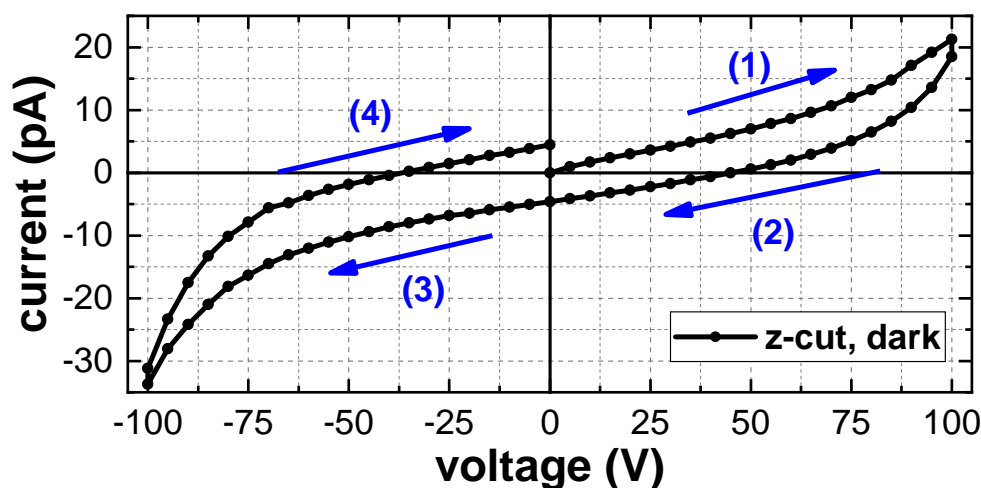


Figure S4. Current-voltage characteristics of the z-cut SBN61 polydomain crystal in the dark up to ± 100 V, measured along the polar z-axis with arrows and numbers in brackets indicating the order and direction of the applied voltage ramps. As expected, a hysteretic ohmic behavior is measured.