Supplementary Material to the article "Local thermometry of $NbSe_2$ flake with delta-T noise measurements"

I. ANOTHER THIN FLAKE

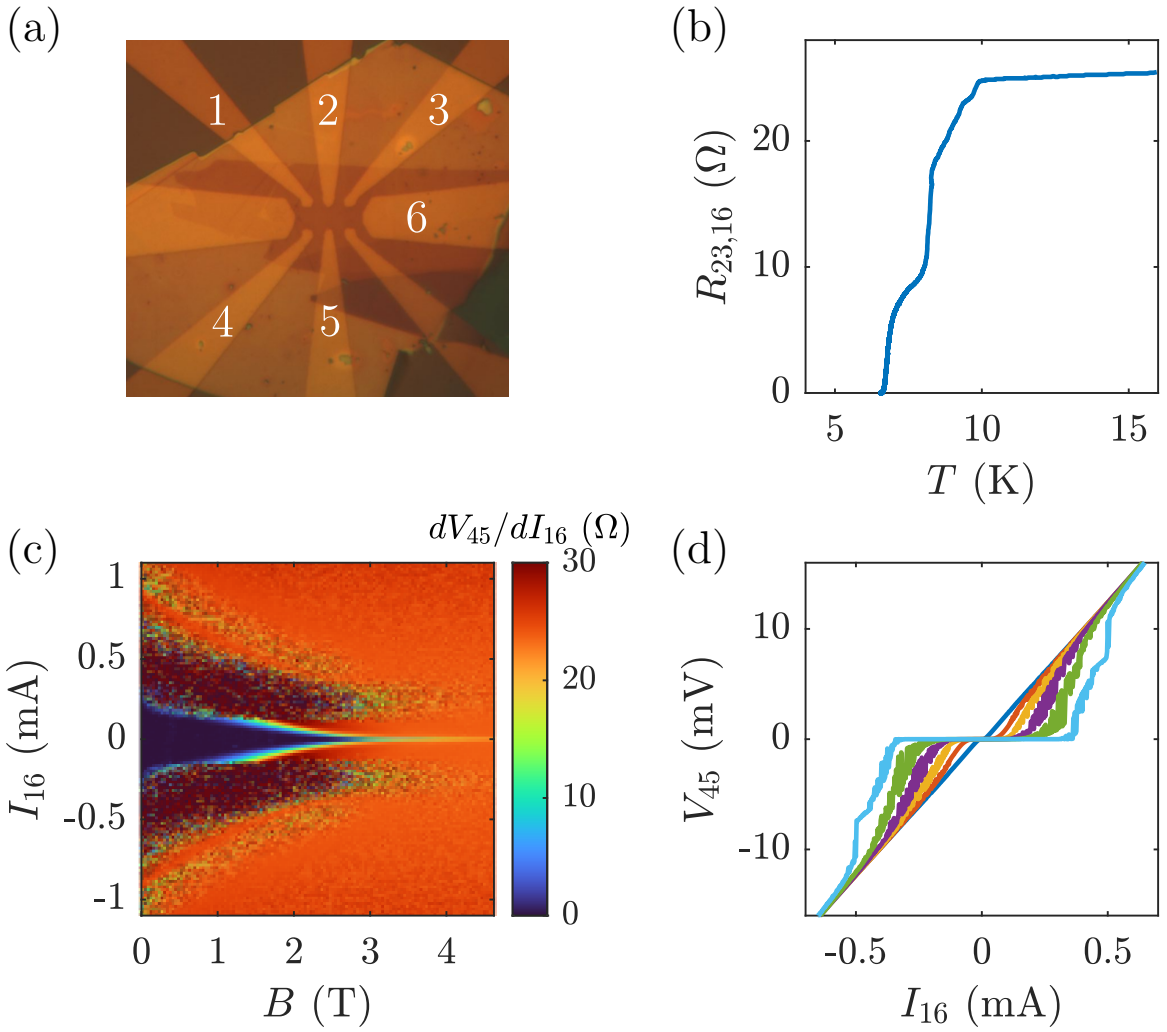

Fig. S1. (a) Optical micrograph of another thin device. Similarly to the main text, exfoliated $NbSe_2$ flake is put on pre-patterned gold contacts and is then covered with hBN flake. (b) Temperature dependence of the four-terminal linear-response resistance $R_{23,16} = dV_{23}/dI_{16}$. (c) Color-scale plot of the four-terminal differential resistance dV_{45}/dI_{16} as a function of the magnetic field and the bias current. (d) Current-voltage characteristics of data from panel (c) at specific values of B = 0, 0.46, 0.97, 1.43, 1.94 and 2.91 T.

II. THICK FLAKE

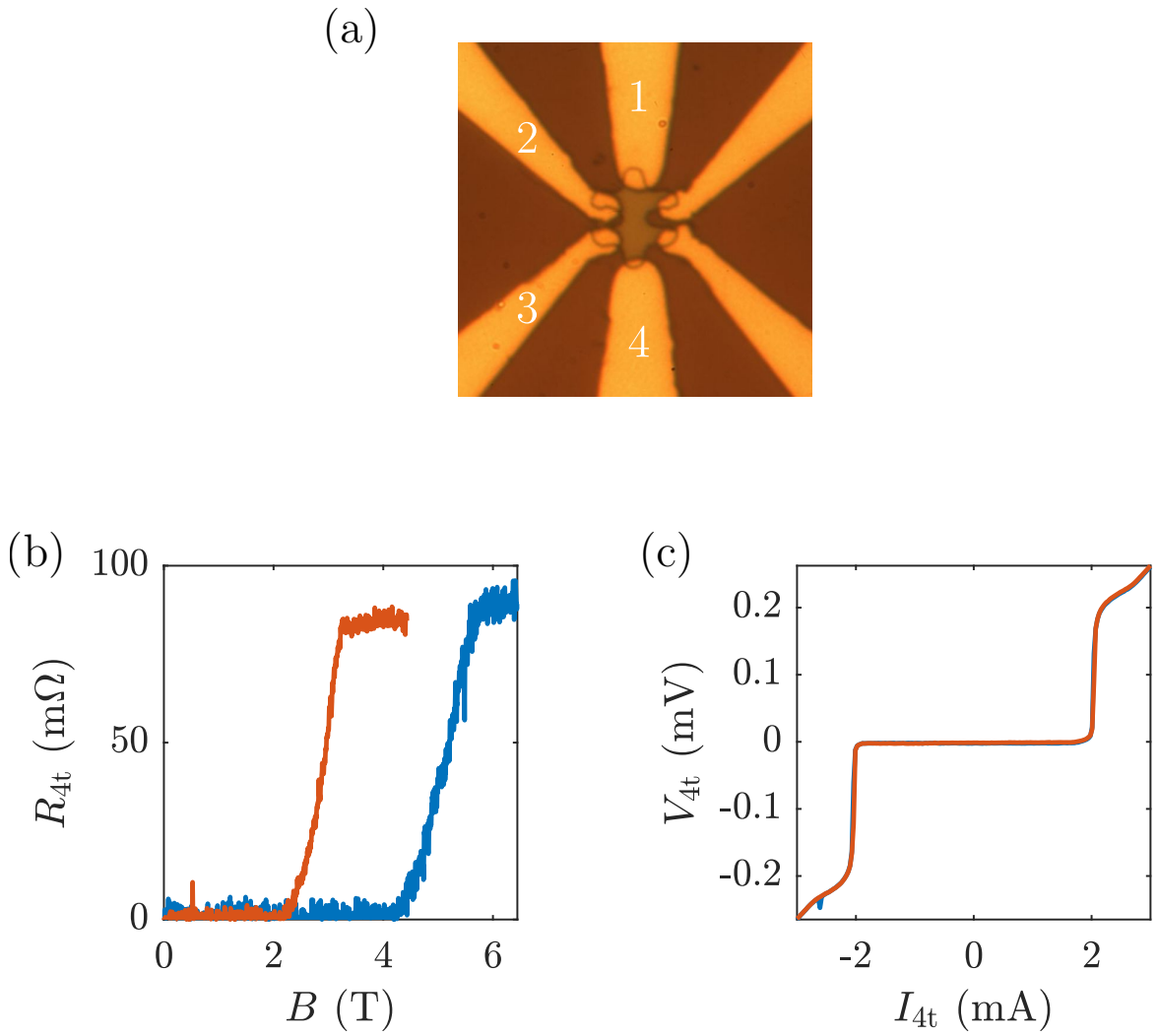

Fig. S2. (a) Optical micrograph of a relatively thick device with lithographically realized contacts. (b) Magnetic field dependence of a four-terminal resistance at $T = 4.2\,\mathrm{K}$ (red curve) and $T = 0.5\,\mathrm{K}$ (blue curve). (c) Four-terminal current-voltage characteristics measured at $T = 4.2\,\mathrm{K}$ for two opposite current sweep directions.

III. ANOTHER TUNNEL JUNCTION ON A THIN FLAKE

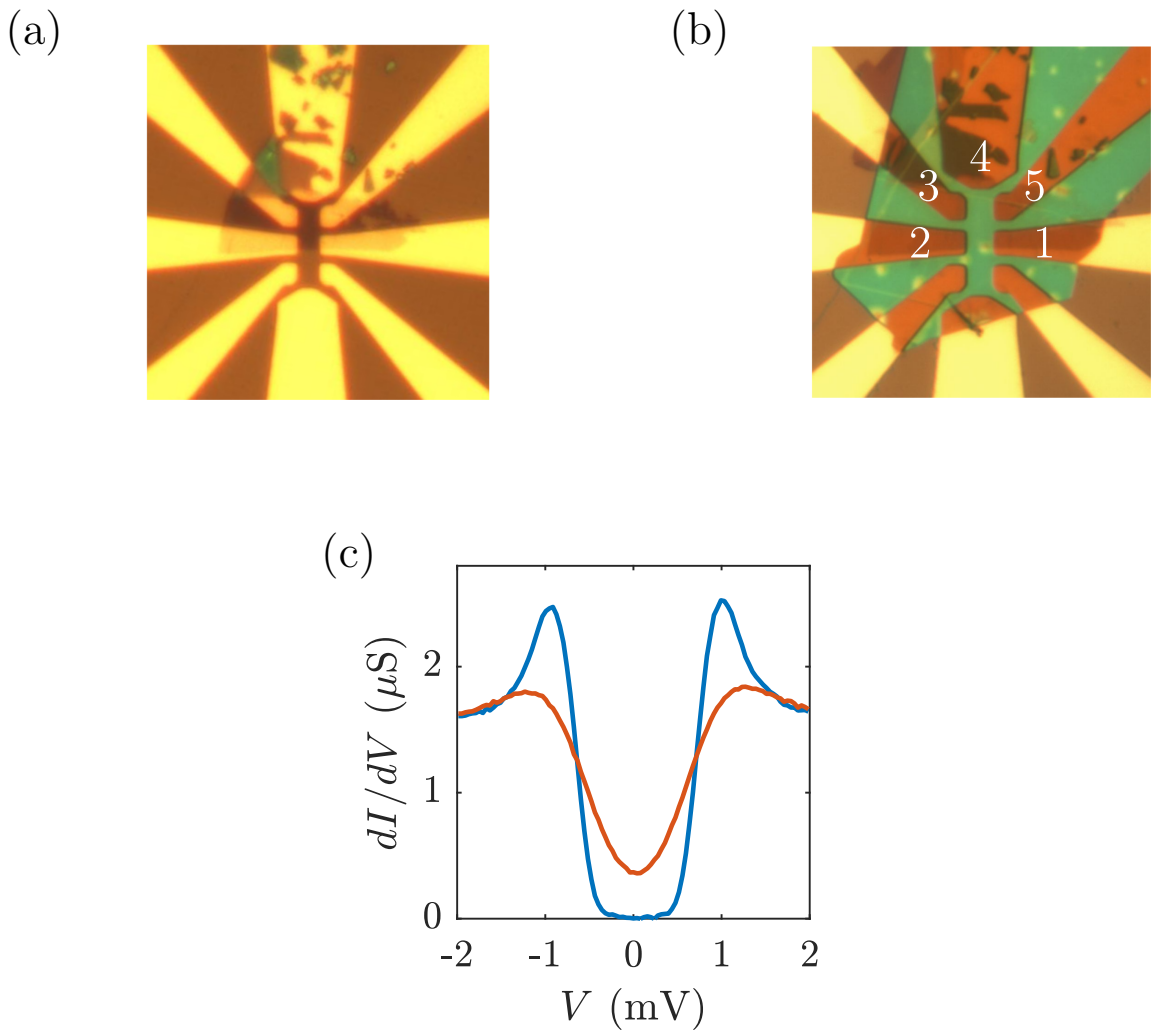

Fig. S3. (a,b) Optical micrograph of a thin device put on predefined gold contacts (a) before and (b) after coverage with hBN flake. Contacts 1, 2, 3 and 4 are in the few hundred Ohms range, contact 5 demonstrates tunnelling characteristics. (c) Differential conductance of contact 5 at $T = 3\,\mathrm{K}$ (red) and $T = 0.7\,\mathrm{K}$ (blue).

IV. *IV* CURVES

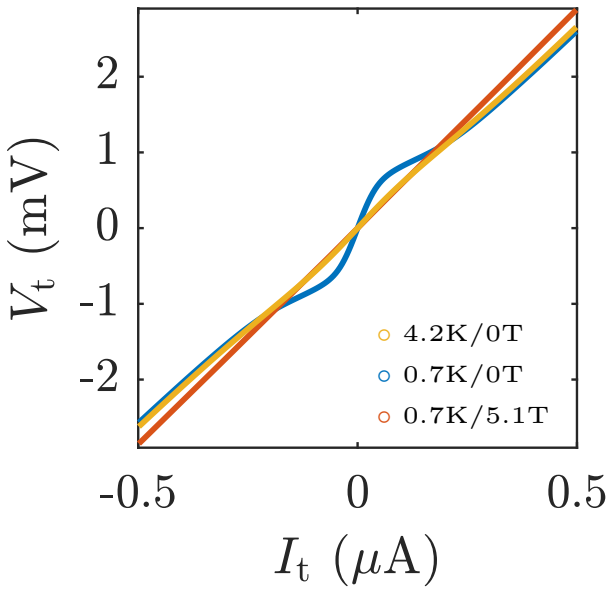

Fig. S4. *IV*-curves of the tunnel junction corresponding to the data of Fig. 2(a) of the main text.

V. DIFFERENTIAL RESISTANCE

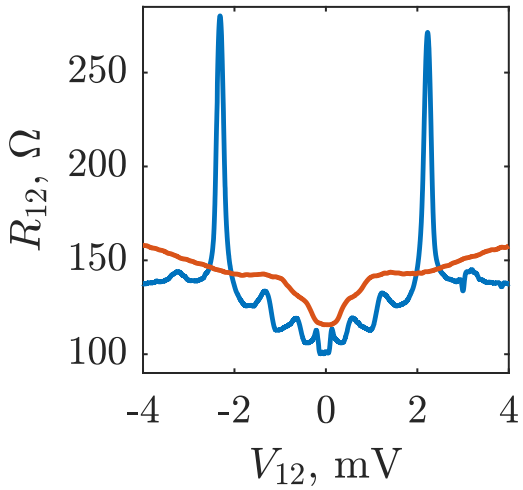

Fig. S5. Quasi- four-terminal differential resistance of the device from the main text at $T = 4.2\,\mathrm{K}$ (red curve) and at $T = 0.7\,\mathrm{K}$ (blue curve). The peaks are completely absent at $T = 4.2\,\mathrm{K}$.

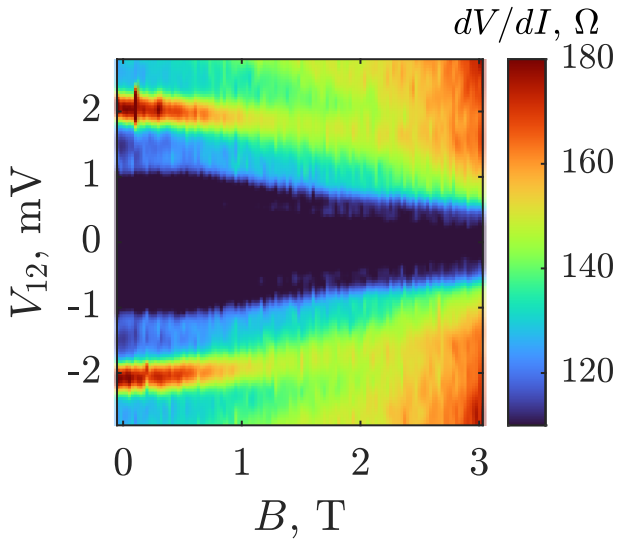

Fig. S6. Evolution of differential resistance R_{12} of the device from the main text with magnetic field and bias voltage at $T = 0.7\,\mathrm{K}$.