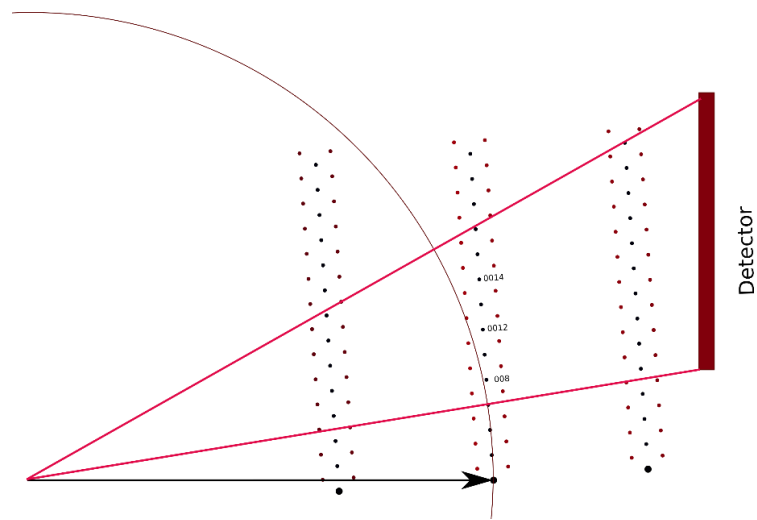


# **SUPPORTING INFORMATION**

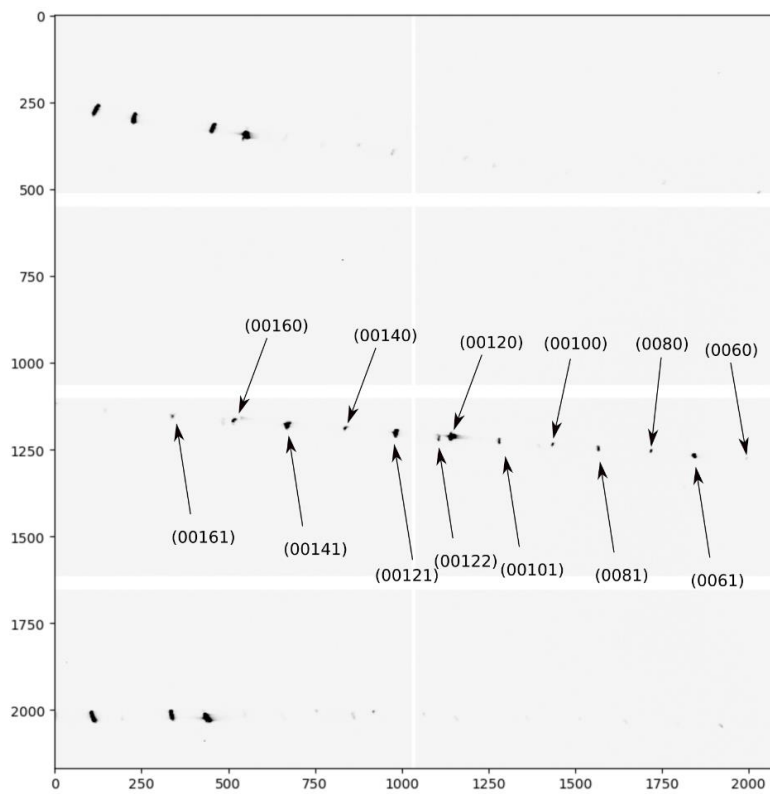
for

**Mapping of structural changes induced by X-ray nanopatterning via  
nano-XRD and corresponding electrical effects**

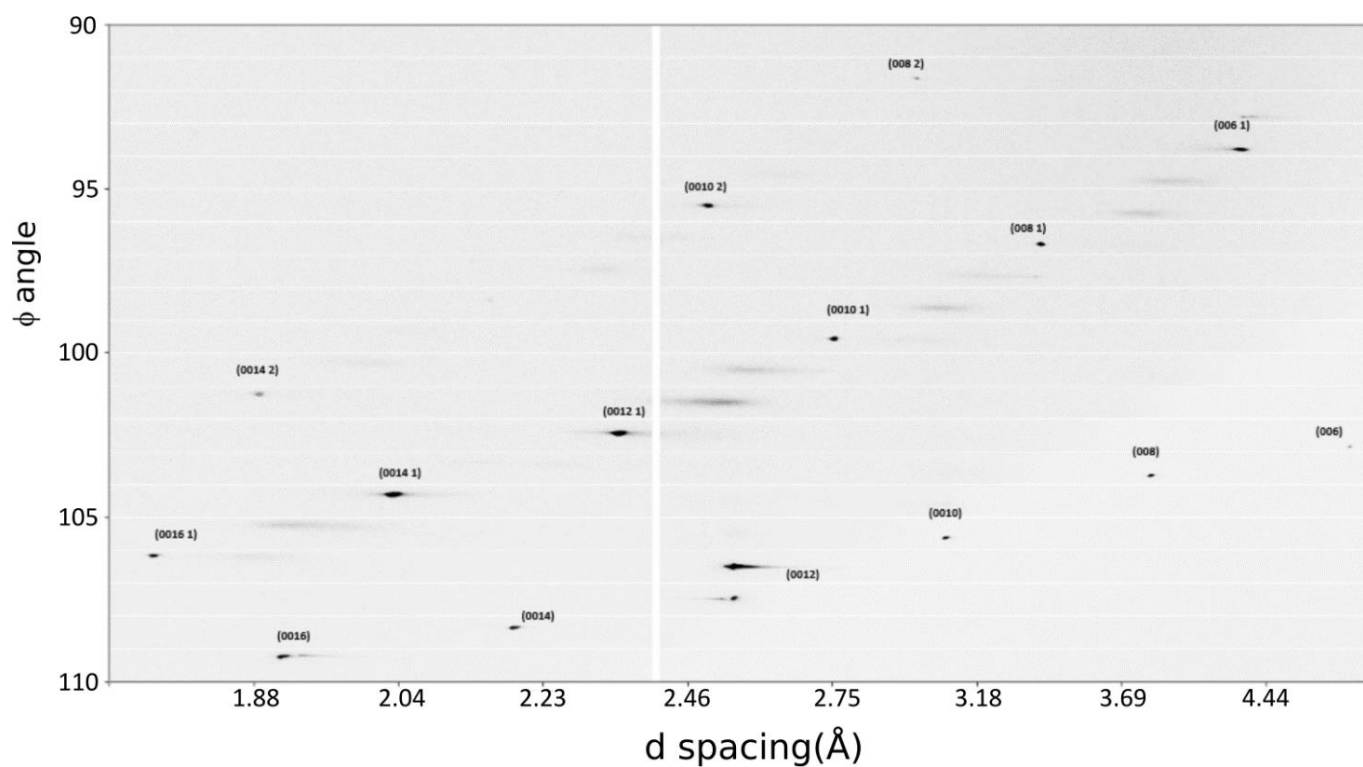
Muhammad Waqas Rabbani, Valentina Bonino, Luca Spessa, Angelo Agostino,  
Natascia De Leo, Carmelo Prestipino, and Marco Truccato



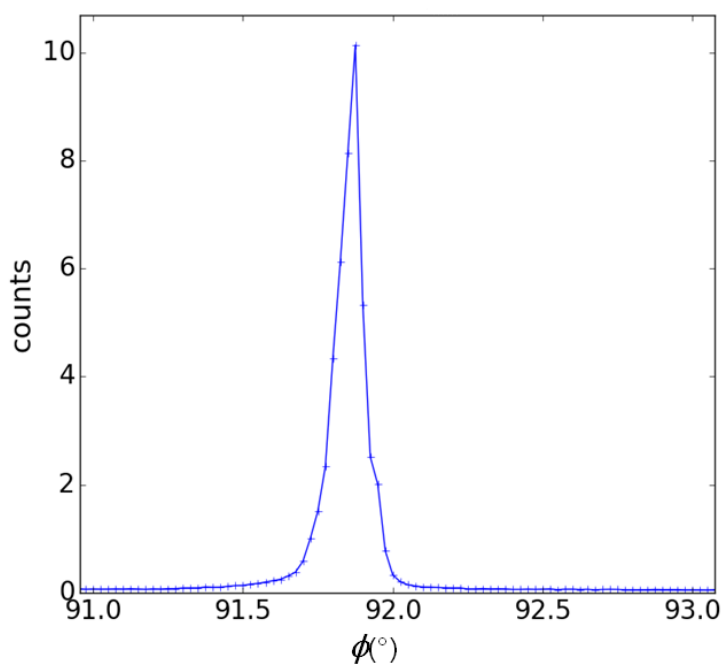
**Fig. S1.** Sketch of the experimental setup, showing the  $hk0$  plane of the reciprocal space, the Ewald sphere and the detector position.



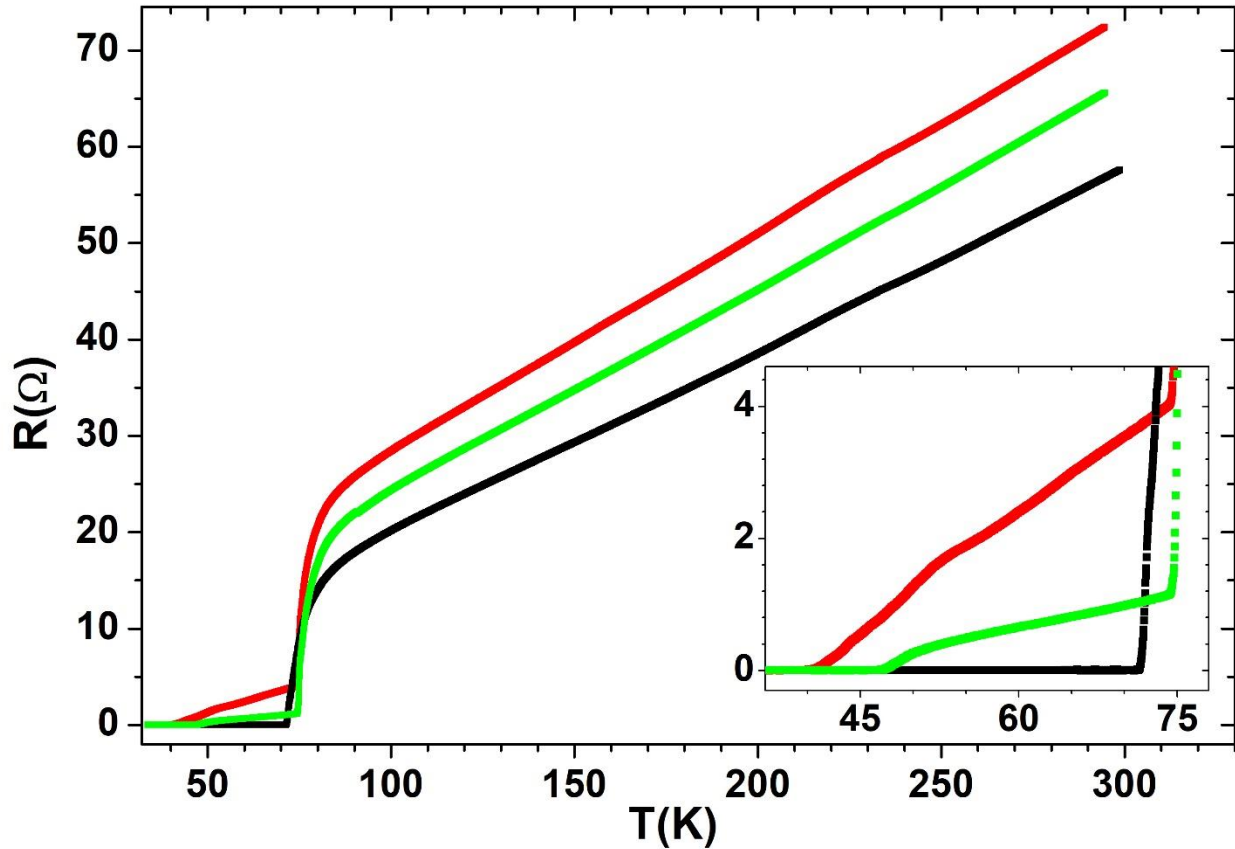
**Fig. S2.** Maximum projection of the initial  $\phi$ -scan, projected along the  $\phi$  coordinate



**Fig. S3.** Mosaic figure representing the region of the detector where reflections (00ln) lay as a function of the  $\phi$  angle. Each horizontal stripe corresponds to the maximum projection of a set of 20 detector images acquired with a step of  $0.05^\circ$ .



**Fig. S4.** Localization curve of the peak of interest (0061) as resulting from a  $\phi$ -scan (i.e. rocking curve).



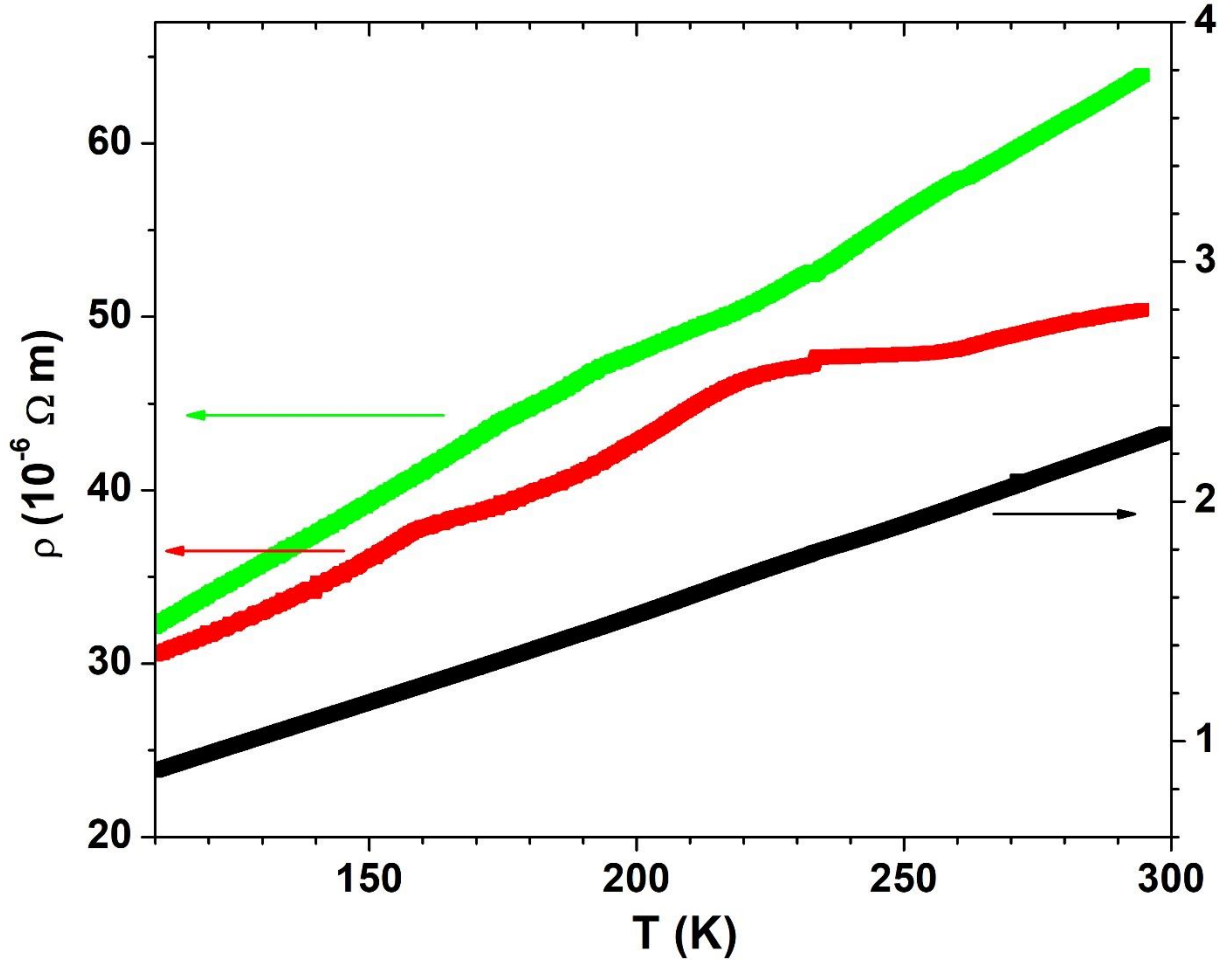
**Fig. S5.** Resistance  $R$  vs temperature  $T$  behavior of the sample that has undergone the most extensive XRD characterization (WBL24). The black curve represents the sample in pristine conditions, the green curve refers to the sample after irradiation at damage position D1 with cumulative dose  $CD = 2.12 \times 10^{11}$  Gy and cumulative fluence  $CF = 3.82 \times 10^{10}$  Jm<sup>-2</sup>, the red curve represents the sample after additional irradiation at damage position D2 with  $CD = 1.91 \times 10^{11}$  Gy and cumulative fluence  $CF = 3.44 \times 10^{10}$  Jm<sup>-2</sup>. The inset zooms in the transition region.

In case of two irradiations at different locations D1 and D2, with material resistivities  $\rho_{irr1}$  and  $\rho_{irr2}$ , respectively, and lengths of the irradiated portions  $l_{irr1}$  and  $l_{irr2}$ , the total resistance of the sample becomes:

$$R_{irr2} = \rho \frac{l - l_{irr1} - l_{irr2}}{S} + \rho_{irr1} \frac{l_{irr1}}{S} + \rho_{irr2} \frac{l_{irr2}}{S} \quad (S1)$$

This implies that the resistivity of the second irradiated region  $\rho_{irr2}$  can be obtained as:

$$\rho_{irr2} = R_{irr2} \frac{S}{l_{irr2}} - \rho \frac{l - l_{irr1} - l_{irr2}}{l_{irr2}} - \rho_{irr1} \frac{l_{irr1}}{l_{irr2}} \quad (S2)$$



**Fig. S6.** Resistivity  $\rho$  vs temperature  $T$  behavior of the sample of Figure S3 (WBL24), as resulting from the application of the subtraction method formalized in Eq.(1) and Eq. (S2). The black curve represents the material in pristine conditions, the green curve refers to the material properties after an irradiation with cumulative dose  $CD = 2.12 \times 10^{11}$  Gy and cumulative fluence  $CF = 3.82 \times 10^{10}$  Jm<sup>-2</sup>, the red curve represents the material condition after an irradiation with  $CD = 1.91 \times 10^{11}$  Gy and cumulative fluence  $CF = 3.44 \times 10^{10}$  Jm<sup>-2</sup>.