## Supporting information: Velocity Map Imaging VUV Angle-Resolved Photoemission on Isolated Nanosystems: Case of Gold Nanoparticles

D.K. Božanić<sup>1,2,\*</sup>, G. A. Garcia<sup>1</sup>, O. Sublemontier<sup>3</sup>, J. Pajovic<sup>4</sup>, V. Djoković<sup>2</sup>, L. Nahon<sup>1,\*</sup>

<sup>1</sup>DESIRS beamline, Synchrotron SOLEIL, l'Orme des Merisiers, St. Aubin, BP48, 91192 Gif sur Yvette Cedex, France

<sup>2</sup>Vinča Institute of Nuclear Sciences, University of Belgrade, P.O. Box 522, 11001 Belgrade, Serbia

<sup>3</sup>CEA - Université Paris-Saclay, IRAMIS-NIMBE- Laboratoire Edifices Nanométriques, Bat. 522, 91191 Gif Sur Yvette Cedex, France

<sup>4</sup>Faculty of Physics, University of Belgrade, P.O. Box 368. 11001 Belgrade, Serbia

\*corresponding authors: <a href="mailto:bozanic@vin.bg.ac.rs">bozanic@vin.bg.ac.rs</a>; <a href="mailto:laurent.nahon@synchrotron-soleil.fr">laurent.nahon@synchrotron-soleil.fr</a>



**Figure S1**. (a) TEM image and (b) the corresponding size distribution of bare gold nanoparticles (AuNP-0). The inset to figure (a) shows a high-resolution image of an individual particle (bar=5 nm). The sample was investigated by a TECNAI F30 instrument operating at 300 kV and a point-to-point resolution of 0.205 nm.



Figure S2. SEM images of aerosol samples deposited onto a conductive substrate.



**Figure S3**. The dependence of the S/B ratio on (b) the type of the carrier gas and (c) the diameter of the focusing diaphragm  $D_f$  for tryptophan aerosol particles recorded at hv=8 eV.



**Figure S4**. The total electron yields for the AuNP-O sample (black line) and the background (red), as well as the dependence of the ratio between the two signals (green) on the phonon energy.



**Figure S5**. (a) The photoelectron images of the AuNP-0 sample recorded at hv=10.2 eV reconstructed by modified pBasex (left) and BASEX (right) algorithms. (b) A simulation showing the effects of a coarse grid pattern observed in the photoelectron images on the VMI parameters obtained by the modified pBasex algorithm.



**Figure S6**. The background-corrected raw and pBasex reconstructed photoelectron image of AuNP-0 recorded at hv= 9 eV, 10 eV, and 12 eV.



**Figure S7**. The background-corrected raw and pBasex reconstructed photoelectron image of the AuNP-S, AuNP-M, and AuNP-B sample recorded at hv=12 eV.



**Figure S8.** The photoemission spectra of the AuNP-0, AuNP-S, AuNP-M, and AuNP-B sample recorded at hv=10 eV.