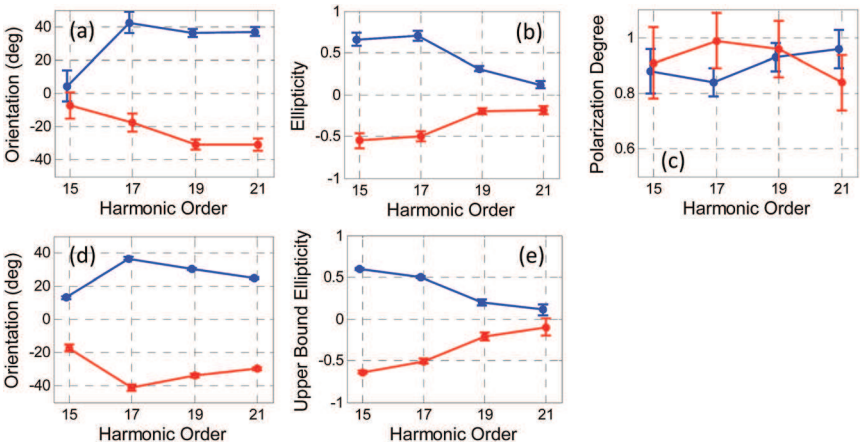

Fig. 8 First row: MP (a) orientation of the polarization ellipse (ψ) relative to the reference direction of the driving IR laser (b) measured ellipticity (ε) (c) polarization degree, for $\varepsilon_{fun} \approx 0.23$ (blue dots) and $\varepsilon_{fun} \approx -0.17$ (red dots). Second row: OP (d) orientation of the polarization ellipse (ψ) relative to that of the driving IR laser (e) ε_{ub} (affecting artificially a negative sign to facilitate the visualization of the result), for $\varepsilon_{fun} \approx 0.2$ (blue dots) and $\varepsilon_{fun} \approx -0.2$ (red dots).

$\varepsilon_{fun} \approx 0.23$ and $\varepsilon_{fun} \approx -0.17$ in the MP measurement), in terms of the polarization ellipse parameters, orientation (ψ) and ellipticity (ε), as well as the degree of polarization P. Fig. 8 also includes the results of optical polarimetry based on Malus' law obtained at SLIC-PLFA in terms of the orientation (ψ) and the upper bound value ε_{ub}.

The orientation displayed in Fig. 8(a) as a function of the harmonic order, derived from the values of s_1 and s_2, strongly increases from about 5° to 40° from H15 to H17 for $\varepsilon_{fun} \approx 0.23$, and then remains rather stable. A quasi-symmetric behavior is observed for $\varepsilon_{fun} \approx -0.17$. The main trend is in good agreement with the variation shown by the PLFA-OP results in Fig. 8(d), displaying smaller error bars than the MP ones for statistical issues inherent to the present MP experiment. It compares fairly well with the previous OP measurements of (ψ) reported by Ferré *et al.*,[38,44] although we do not observe in the MP and PLFA-OP data the reported sign change of the orientation angle between H15 and H17: this might be attributed to the "quasi-circular" polarization at such HH energies, where the ellipse orientation nearly vanishes leading to larger uncertainties in its determination, or to the high sensitivity of the polarization characteristics to the generation conditions, *e.g.*, a different detuning from resonances in this energy region. As noted above, measuring s_3, in addition to s_1 and s_2, provides an unambiguous determination of the ellipticity of each HH, including its sign, ranging here from $\varepsilon \approx 0.70 \pm 0.06$ for H15 and H17 down to $\varepsilon \approx 0.31 \pm 0.03$ and $\varepsilon \approx 0.12 \pm 0.04$ for H19 and H21, for $\varepsilon_{fun} \approx 0.23$. This demonstrates that the large ε_{ub} found for H15 and H17 in OP reported by Ferré *et al.*,[38,44] and presently measured at SLIC-PLFA, is indeed due to the high degree of ellipticity of the polarization and not to a significant depolarization for these HHs.

The polarization degree shows, for the case $\varepsilon_{fun} \approx 0.23$, some deviation from the maximum value of 1 for the resonant harmonics 15 and 17, although with

