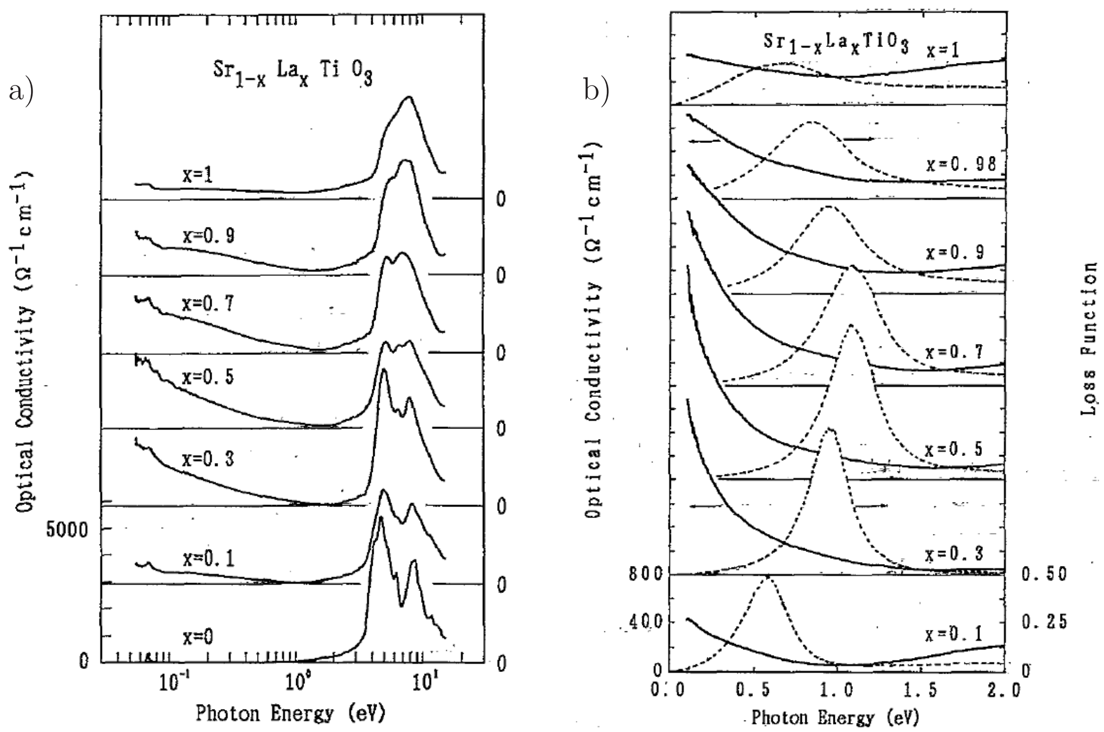

Figure 5.19: a)+b) Optical conductivity $\sigma(\omega)$ (solid lines) as measured by Fujishima et al. (1992) at $T \approx 300$ K. Since x here corresponds to the t_{2g} band filling, $x \approx 1$ is the strongly correlated limit. **b)** Low-energy part with a linear scale and electronic energy-loss function $\mathrm{Im}\,(-1/\epsilon)$ (dashed lines).

band, a large part of it must be due to excitations involving other bands. Note that a tail of this contribution extends down to about 1 eV. The width of the remnant of a Drude peak is even much larger than found in our high-temperature calculations which points towards strong disorder. Curve "C" in Fig. 5.20 a shows $\sigma(\omega)$ measured for $La_{1-x}SrTiO_3$ with $x \approx 0.07$ (Crandles et al., 1994). Here, a sharp Drude peak is observed at very low frequency $\omega \lesssim 0.1$ eV while for larger frequencies the curve is almost flat. If this is significant, disorder effects seem to be less important in this case.

In both cases, there is no obvious agreement with any of the results shown in Fig. 5.18, i.e., with the (intraband absorption only) LDA+DMFT theory. While the minimum experimentally seen in $\sigma(\omega)$ slightly above 1 eV would find correspondence in the theoretical results for $U = 4.25$, the computed Drude weight seems still too large even for $U = 5.0$.

The remaining three figures for $\sigma(\omega)$ in doped titanates are all due to Tokura's group. While Fig. 5.20 b relates to $LaTiO_{3+\delta/2}$ and shows noisy peaks at low frequencies (Okimoto et al., 1995), a curve for $La_{1\text{-}x}Sr_xTiO_3$ with $x = 0.1$ has been added to a selection of the same curves in Fig. 5.21 a (Katsufuji et al., 1995). In the latter diagram, also the low-frequency parts have been removed. Finally, Fig. 5.21 b apparently shows the same measured data (solid lines) as Fig. 5.21 a, but now ex-