Resonant inelastic x-ray scattering studies of elementary excitations
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Stellingen

accompanying the PhD thesis

Resonant Inelastic X-ray Scattering Studies of Elementary Excitations

1. Although RIXS processes can be well approximated in many cases by single ion calculations, they by no means are local. All equivalent ions in the material may scatter an incident photon, and the total RIXS process is a superposition of all these local scattering events.

   This thesis, chapter 2

2. An excitation in a lattice with no dispersion can still carry momentum.

   This thesis, chapter 2

3. The phonon spectrum shows up in two entirely different ways in RIXS, depending on the charge distribution before and after the RIXS process. If the charge distribution is changed, many phonons are created, while if the charge distribution is the same, only a few phonons are excited.

   This thesis, chapter 7

4. The absence of a single-orbiton peak in L edge RIXS data of $YTiO_3$ can be explained consistently within a superexchange-dominated model for the Ti 3d t_{2g} orbitals.

   This thesis, chapter 5

5. The next step after thinking of a theory is not to expand it, but to determine how it can be simplified.

6a. One might think that performing the famous double-slit experiment with a virus is not so much interesting for the scientist as it is for the virus. Tragically, as soon as the virus is able to notice its remarkable flight, it will not be remarkable anymore.

6b. A much better way to bring a virus in a quantum mechanical superposition is to glue it to the cantilever of experiments such as described in New J. of Phys. **10**, 095020 (2008).

7. The correspondence between n-dimensional quantum systems and n+1-dimensional classical systems does not mean one can do quantum computations on a classical system. First, the classical correlations are exponentially damped, and second, one has to measure an exponentially large amount of classical systems.

Unpublished work with D.I. Santiago, J.M.J. van Leeuwen,
H.W.J. Blöte, and J. van den Brink

8. In practice, the use of new, brilliant X-ray sources is not limited by the Schwinger critical field, but by the power necessary to evaporate one's samples.

9. The biggest problem for democracy today is that political debates are degenerating into the exchange of one-liners. Like the stellingen.

10. The perception of God is much like that of a RIXS spectrum: where some see only noise, others insist there is something there.

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