

Publications

1. **Ž. Kovačević, N. M. Plakida**, Pis'ma v ZhETF **57** (1993) 238-241;
['O vliyanii spinovyh fluktuacij na shirinu perehodov 4f - elektronov v Tm-YBCO – soedineniah'](#),
JETP Lett. **57** (1993) 249-252.

['Effect of spin fluctuations on the linewidth of 4f-electron transitions in Tm-YBCO compounds,](#)

The s - f interaction of the rare-earth ion Tm^{3+} with copper spins in Tm-YBCO compounds is analyzed. An expression is derived for the linewidth of transitions in the crystal electric field for Tm^{3+} . Dynamic spin fluctuations in CuO_2 dominate the line broadening.

http://www.jetpletters.ac.ru/ps/1177/article_17770.shtml

2. **Kovacevic, Z. / Plakida, N.M.**, *Physica C*, 228 (1), p.15-21, Jul 1994
['Spin-fluctuation linewidth of the 4f electron crystal-field levels in cuprates'](#)

The crystal-field excitation linewidth $\Gamma_{CEF}(T)$ in the Tm-YBCO system due to s - f interactions is calculated. The method of the two-time Green functions was used in the two-level approximation for crystal-field excitations. It is shown that...

3. **Kovacevic, Z. / Plakida, N.M.**, *Physica C*, 235, p.1685-1686, Dec 1994
['On the crystal field line broadening due to spin fluctuations in cuprates'](#)

The crystal field excitation linewidth $\Gamma_{CF}(T)$ in the Tm-YBCO system is calculated due to s - f interaction. By using a two-level approximation for crystal-field excitations, it is shown that antiferromagnetic spin fluctuations in the CuO_2 ...

4. **Ž. Kovačević and N.M.Plakida**,
['On the crystal field line broadening due to spin fluctuation in cuprates'](#), in *Strongly Correlated Systems*, ed. by N. M. Plakida, p. 28, Dubna 1994.

5. **Ž. Kovačević**
['O relaksaciji pobudjenih 4f - elektrona preko spinskih fluktuacija u kupratima](#), u *Zborniku radova na IX Kongresu fizičara Jugoslavije*, Društvo matematičara i fizičara Crne Gore i Društvo fizičara Srbije, Petrovac na Moru, 1995, str. 181-184.

6. **Z. Kovacevic¹, R. Hayn², N.M. Plakida**, *Eur. Phys. J. B*, **10**, 487-495, 1999
['Effective Hubbard model for Zn-doped \$CuO_2\$ plane'](#)

In the framework of the cell-perturbation method for the original p - d model an effective two-band Hubbard model for the CuO_2 plane with Zn impurities is derived. Zn impurities are modelled by Wannier oxygen one-hole states at vacant Cu sites. The model is based on the results of band structure calculations carried out within the local-density approximation. Further reduction to an extended t - J model shows a large ferromagnetic superexchange interaction between the Cu spin with the nearest virtual oxygen spin in the Zn cell.

7. **Plakida, N.M. / Kovacevic, Z. / Chaplygin, I. / Hayn, R. ,** *Physica C*, 341, p.287-288, Nov 2000
[‘Electronic structure for Zn-doped copper-oxide planes’](#)

A microscopical model for the Zn-doped CuO₂ plane is developed within the p-d model with strong correlations. Based on band structure calculations, Zn impurities are considered as vacancies for the d-states on Cu sites. Further...

8. **Ž. Kovačević, I. Chaplygin, R. Hayn, N.M. Plakida,** *Eur. Phys. J. B*, **18**, 377-384, 2000.
[‘Electronic spectrum in a microscopical model for the Zn-doped CuO₂ plane’](#)

We consider a microscopical model for the Zn-doped CuO₂ plane with Zn impurities being described as vacancies for the d-states on Cu sites. A reduction of the original p-d model to an effective one-band model results in the t-J model with vacancies for the spin 1/2 d-states at the Zn-sites. By employing the T-matrix formalism for the Green functions in terms of the Hubbard operators the density of electronic states (DOS) is calculated. Symmetry analysis of the perturbation matrix shows that in the system with d-type electronic wave functions additional DOS of d-, p- and s-types appear due to the perturbation of local energy levels and the interaction between nearest neighbors around the vacancy. The local and resonant state formation caused by Zn impurities is analyzed.

9. **Ž. Kovačević, R. Hayn and N. M. Plakida,**
[‘Priraštaj gustine stanja u t-J modelu sa primjesnim Atomom’](#), u Zborniku radova na X Kongresu fizičara Jugoslavije, Jugoslovensko društvo fizičara, Vrnjačka Banja, 2000, str. 345-348.

10. **Ž. Kovačević, N. M. Plakida and R. Hayn,** *Theoretical and Mathematical Physics*, **136** (2): 1155-1166 (2003)
[‘Resonant states in high-temperature superconductors with impurities’](#)

A microscopic theory of resonant states for the Zn-doped CuO₂ plane in the superconducting phase is formulated in the effective t-J model. In the model derived from the original p-d model, Zn impurities are considered as vacancies for the d states at Cu sites. In the superconducting phase, in addition to the local static perturbation induced by the vacancy, a dynamical perturbation appears that results in a frequencydependent perturbation matrix. Using the T-matrix formalism for the Green’s functions in terms of the Hubbard operators, we calculate the local density of electronic states with d-, p-, and s-symmetries.

11. **Ž. Kovačević, N. M. Plakida i R. Hayn**
[‘Rezonantna stanja u visokotemperaturnim superprovodnicima sa nemagnetnom primjesom’](#), u Zborniku radova na Kongresu fizičara Srbije i Crne Gore, sekcija 4, 81-84, Petrovac na Moru, 2004.

12. **M. Jaćimović i Ž. Lj. Kovačević,**
[‘Projekcioni metod funkcija Grina u BCS modelu superprovodnika’](#), CANU, Glasnik odjeljenja prirodnih nauka, **16** (2005) 15 – 25

The projection technique in the equation of motion for the Green function was applied in order to investigate the spectrum of the elementary excitations in the Bardin-Cooper-Schrieffer model for classic superconductors

13. **Ž. Lj. Kovačević, F. R. Vukajlović**, IJMPB **19** (2005) 4399 – 4417
[‘Electronic Structure for the Two-band Hubbard Model of the Ladder \$\alpha'\$ - \$\text{NaV}_2\text{O}_5\$ Compound’](#)

An effective Hubbard model for one-particle d-like states and two-particle singlet states is derived in order to describe the low-energy electronic spectrum in ladder α' - NaV_2O_5 compound. The energy shifts and the renormalized hopping parameters for the considered electronic states are calculated on the basis of the projection technique for the two-time matrix Green's function in terms of Hubbard operators.

14. **Ž. Lj. Kovačević i F. R. Vukajlović**, [‘Dvozonski Habardov model za \$\alpha'\$ – fazu natrijum vanadijum pentoksida’](#) u Zborniku radova na Kongresu fizičara Srbije i Crne Gore, Sekcija 4, 85-88, Petrovac na Moru, 2004.

15. **Ž. Lj. Kovačević and V. S. Oudovenko**, Физика элементарных частиц и атомного ядра. Письма.-2008.-Т.5, No.5.-p.793-805,
Physics of Particles and Nuclei Letters, Physics of Solid State and Condensed Matter, 2008, Vol. 5, No. 5, pp. 473–480.
JINR Preprint, E 17-2005-140, Dubna (M.O), 2005.
[‘Pauli spin susceptibility in the \$t\$ - \$J\$ model’](#)

Using a self-consistent theory for the Green function of Hubbard operators, the spin susceptibility is calculated as a function of the carrier concentration.

16. **K. Ivanović and Ž. Kovačević**, Journal of Research in Physics, Vol. **31**, No. 1, P. , 2007.
[Looking for the resonant states in high-temperature superconductors with impurities](#)

A microscopic theory of resonant states for the Zn-doped CuO_2 plane in superconducting phase, formulated within the effective t - J model, was further applied to obtain local density of states (or differential conductance, measured by scanning tunneling microscopy) at the impurity site.

17. **Ž. Lj. Kovačević**, Физика элементарных частиц и атомного ядра. Письма.- 2007, Т. 4, No 5(141), P. 731-739.
Physics of Particles and Nuclei Letters, Physics of Solid State Physics, 2007, Vol. 4, № 5, pp. 440-445,
[‘Local spin magnetization around Zn ion which is doped in the \$\text{CuO}_2\$ plane’](#)

The local static spin susceptibility at neighbor sites from vacant Cu in the CuO_2 plane was obtained. Calculations were performed using one of the variants of the memory function method. Charge transfer and spin-flip correlation functions were expressed in the framework of the T -matrix formalism in terms of the corresponding Green functions for the ideal t - J model on the square lattice.

18. **Ž. Lj. Kovačević**, [‘Local and Staggered Spin Susceptibilities Around Vacancy in the \$\text{CuO}_2\$ Plane’](#), pp. 150-153, XVII Symposium on Condensed Matter Physics, Vršac, Serbia, 2007.

The local and staggered static spin susceptibilities at neighboring sites from vacant Cu in the CuO_2 plane was obtained in terms of charge-transfer and spin-flip correlation functions. Calculations were performed using one of the variants of the memory function method developed for the ideal t - J model in the Hubbard operator representations.