

## Low-temperature peculiarities of thermodynamic quantities for decorated spin chains

T. Krokhmalksii,<sup>a</sup> T. Hutak,<sup>a</sup> O. Rojas,<sup>b</sup> S. M. de Souza,<sup>b</sup> and O. Derzhko<sup>a,c</sup>

<sup>a</sup>*Institute for Condensed Matter Physics, National Academy of Sciences of Ukraine, 1 Svientsitskii Str., 79011 L'viv, Ukraine*

<sup>b</sup>*Departamento de Física, Universidade Federal de Lavras, CP 3037, 37200-000, Lavras-MG, Brazil*

<sup>c</sup>*Department of Metal Physics, Ivan Franko National University of L'viv, 8 Kyrylo & Mephodyi Str., 79005 L'viv, Ukraine*

We discuss the origin of the peculiar low-temperature behavior of one-dimensional decorated spin systems [1-4] which was coined the pseudo-transition [5]. Tracing out the decorated parts results in the standard Ising-chain model with temperature-dependent parameters and an unexpected low-temperature behavior of thermodynamic quantities and correlations of the decorated spin chains can be tracked down to the critical point of the standard Ising-chain model at  $H = 0$  and  $T = 0$  [6].

We illustrate this perspective using as examples the spin-1/2 Ising-XYZ diamond chain and the coupled spin-electron double-tetrahedral chain. We have verified that the pseudo-critical exponents satisfy the following universality relation:  $\alpha = \alpha' = \gamma = \gamma' = 3\nu = 3\nu' = 3$  [7].

[1] L. Gálisová and J. Strečka, Phys. Rev. E **91**, 022134 (2015).

[2] J. Torrico, M. Rojas, S. M. de Souza, and O. Rojas, Phys. Lett. A **380**, 3655 (2016).

[3] O. Rojas, J. Strečka, and S. M. de Souza, Solid State Communications **246**, 68 (2016).

[4] J. Strečka, R. C. Alécio, M. L. Lyra, and O. Rojas, J. Magn. Magn. Mater. **409**, 124 (2016).

[5] S. M. de Souza and O. Rojas, Solid State Communications **269**, 131 (2018); P. N. Timonin, J. Exp. Theor. Phys. **113**, 251 (2011).

[6] R. J. Baxter, *Exactly Solved Models in Statistical Mechanics* (Academic Press, 1982).

[7] O. Rojas, J. Strečka, M. L. Lyra, and S. M. de Souza, *Universality and “pseudo-critical” exponents of one-dimensional models displaying a “pseudo-transition” at finite temperatures*, arXiv:1812.02815.