Long standing mathematical physics puzzle solved

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A University of Queensland research team led by senior mathematics lecturer Dr Yao-Zhong Zhang has successfully solved a major long-standing problem in mathematical physics.

Dr Zhang and his postdoctoral fellows Wen-Li Yang and Shao-You Zhao, from the North West University in China, have discovered the determinant representation of correlation functions of the supersymmetric t-J model.

Dr Zhang said the theoretical problem had been around for many years.

“The analytic computation of correlation functions was arguably one of the most challenging and notoriously difficult problems in mathematical physics and its solution will have important implications.

“It opens doors to further research in the theory of exactly soluble models as well as in pure mathematics, statistical mechanics and condensed matter physics.”

Dr Zhang said the work had attracted a great deal of academic interest and had been described by world-leading authorities in the field as a “major breakthrough” and a “great discovery”.

A paper on the solution will appear in the January 2006 issue of the *Journal of Mathematical Physics*, a leading international scientific journal published by the American Institute of Physics.

A second paper has also been submitted to the prestigious mathematical physics journal *Communications in Mathematical Physics*.

Dr Zhang and his research team have also been approached by the *International Journal of Modern Physics B* to write a review article on their research.

Source: University of Queensland