Interior bubbling solutions for the critical Lin-Ni-Takagi problem in dimension 3

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We consider the problem of finding positive solutions of the problem ?u ? ?u + u 5 = 0 in a bounded, smooth domain ? in ? 3 , under zero Neumann boundary conditions. Here ? is a positive number. We analyze the role of Green?s function of ?? + ? in the presence of solutions exhibiting single bubbling behavior at one point of the domain when ? is regarded as a parameter. As a special case of our results, we find and characterize a positive value ? * such that if ? ? ? * > 0 is sufficiently small, then this problem is solvable by a solution u ? which blows-up by bubbling at a certain interior point of ? as ? ? ? * .