Sums of squares coprime in pairs

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We consider the representation of natural numbers in the proposed form, with three and four variables. Our work yields an asymptotic formula for the number of such representations. The method is effective for sums of four squares, answering affirmatively a question of Schinzel. For sums of three squares, Siegel's lower bound for Dirichlet L series near 1 is needed, rendering the result ineffective.