Some properties of the density for a 3-d stochastic wave equation

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Abstract. We consider a stochastic wave equation in space dimension three driven by a noise white in time and with an absolutely continuous correlation measure given by the product of a smooth function and a Riesz kernel. Let $p_{t,x}(y)$ be the density of the law of the solution $u(t,x)$ of such an equation at points $(t,x) \in]0,T] \times \mathbb{R}^3$. We prove that the mapping $(t,x) \mapsto p_{t,x}(y)$ owns the same regularity as the sample paths of the process $\{u(t,x), (t,x) \in]0,T] \times \mathbb{R}^3\}$. The proof uses Malliavin calculus, in particular Watanabe's integration by parts formula and estimates derived form it.