Claim $X_1, \ldots, X_n$ Gaussian

Then $L = \sum |X_i|$ has a cts pdf.

Proof:

$$f_L(z) = \int_{-\infty}^{\infty}$$

$$\mathbb{E}[L \mid \nabla f(t)] = \sum_i \mathbb{E}[|X(i)| \mid \nabla f(t)]$$

$$L = \sum |X(i)|$$

$$f(t) = \sum_i K(t-i) X(i)$$

$$\Rightarrow \nabla f(t) = \sum_i \nabla K(t-i) X(i)$$

So $X(i), \nabla f(t)$ is jointly Gaussian.

so $\mathbb{E}[|X(i)| \mid \nabla f(t)]$ is finite.

so $X(i) \mid \nabla f(t)$ is Gaussian. so has finite first moment