Calcular $I \;=\; \displaystyle\int_0^{\pi} \sin^2\left(\frac{x}{4}\right)\cos\left(\frac{x}{4}\right)\; dx.$

Seja $u = \sin\left(\frac{x}{4}\right)$, $du \;=\; \dfrac{\cos\left(\frac{x}{4}\right)}{4}\; dx.$

$I \;=\; 4\displaystyle\int_0^{\sqrt{2}/2} u^2\; du \;=\; \boxed{\frac{\sqrt{2}}{3}}$

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