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| **Abstract:** |  |
| By developing a novel rectenna system, this study advances wireless power transmission technology for medical implants, including neurostimulators and pacemakers. With a patch antenna tuned for the 433 MHz ISM band frequency, the study painstakingly designs a biocompatible rectenna that is compatible with human flesh. The research refines the antenna design and incorporates an impedance-matching network to improve power transfer efficiency using CST Microwave Studio and ADS software. The inclusion of a nonlinear diode model, which precisely models the diode's behavior inside the rectifying circuit and optimizes the rectenna's RF-to-DC conversion process, is a novel component of this work. The antenna is positioned between the layers of skin and muscle using extensive simulations to reduce return loss and comply with specific absorption rate (SAR) safety requirements. The result of their efforts is a very effective rectenna that exhibits an approximate 84.816% RF-to-DC conversion efficiency, which represents a substantial advancement in the safe and smooth integration of wireless power technology into medical devices. | |