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## 非接觸式供電系統關鍵技術之開發-子計畫三：

### 非接觸式高頻交流電源供應關鍵技術之開發

## **Key Technologies Development for Contactless High Frequency AC Power Supply System**

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### 摘要

本子計劃擬以兩年的時間開發一用於非接觸式供電系統(Contactless Power Supply System)之高頻交流電源供應系統(High Frequency AC Power Supply System)。本子計畫分別採用半橋與全橋 DC/AC 轉換器配合串振槽(Serial-Resonant Tank)的方式研製一高頻弦波 DC/AC 轉換器(High Frequency Sine Waves DC/AC Inverter, HFS-DC/AC)，並利用鎖相迴路技術，使高頻弦波 DC/AC 轉換器追蹤並保持在諧振點，達到最佳功率轉移。然因非接觸式電源供電系統其負載變異性很大，進而造成高頻弦波 DC/AC 轉換器 (HFS-DC/AC)的諧振點在一大範圍中變動，增加系統的不穩定性與複雜性。為解決此問題，本計劃利用一相位控制式可變電感器(Phase-controlled Variable Inductor, PCVI)與一相位控制式可變電容器(Phase-controlled Variable Capacitor, PCVC)來控制高頻弦波 DC/AC 轉換器(HFS-DC/AC)的諧振點範圍，構成一高性能之高頻弦波 DC/AC 轉換系統。本計劃第一年擬以研製

一 1kW 半橋串振式 DC/AC 轉換器輔以鎖相迴路技術，用以驗證高頻  
弦波 DC/AC 轉換器(HFS-DC/AC)的可行性與優異性。第二年除研製  
一 3KW 零電壓切換全橋串振式 DC/AC 轉換器，亦研製一 1KW 相位  
控制式可變電容器與一 1KW 相位控制式可變電感器(PCVI)，構成一  
完整的高頻交流電源供應系統。最後和其它子計劃整合，構成一完整  
的非接觸式供電系統。

### Abstract

In this project, a high frequency AC power supply system will be developed in two years for powering the contactless power supply system. The half-bridge and full-bridge topologies are used to build a high frequency sine wave DC/AC inverter (HFS-DC/AC). The phase-locked loop (PLL) technique is also adopted to track and keep the HFS-DC/AC working in resonant point for obtaining the maximum transfer efficiency. Beside, a phase-controlled variable inductor (PCVI) and a phase-controlled variable capacitor (PCVC) are built to maintain the resonant frequency of the HFS-DC/AC in a desire region to increase the system stability and performance. First year, 1kW half-bridge serial-resonant DC/AC with PLL will be realized to verify the flexibility of the HFS-DC/AC. Second year, a 3KW full-bridge ZVC serial-resonant DC/AC with a 1KW PCVI and a 1KW PCVC will be built to construct a high power, high performance and high frequency AC power supply system.