



# Mechanical Auto-tuning for High Magnetic Fields (20120121, Dr. Tommy Vaughan)

**IP Status:** Issued US Patent; **Application #:** 14/469,527

## Resistance Inductance Capacitance Technology

A variable resistance inductance capacitance (R-L-C) technology electrically controls a mechanical movement device (e.g., linear positioner, rotary motor, or pump) that selectively controls an electrical element to vary, and maintain at a selected value, its electrical resistance, inductance, and/or capacitance. The method uses an electrical signal to automatically move a portion of the electrical component in relation to another portion (to vary at least one of its parameters) by using a non-magnetic mechanical movement device. Its components are compatible with and function in high fields (such as a magnetic field of one tesla or more, or even ten tesla or more and/or an electric field of many thousands of volts per meter).

## Compatible with High Magnetic and Electric Fields

Conventional electrical components that vary resistance, inductance, and/or capacitance under electrical control typically have somewhat limited component values available and are not compatible with being located in high fields (e.g., the fields of 1 tesla or more, typically found in high-energy physics experiments). Low-power circuits use varactors, field-effect transistors and directly electrically-adjustable components for adjusting frequency, impedance or other circuit characteristics and parameters, but such components are often unsuitable or inoperative in high fields. This technology provides a variable-parameter electrical component in a high-field environment and, based on an electrical signal, automatically moves a movable portion of the electrical component in relation to another portion to vary at least one of its parameters.

### BENEFITS AND FEATURES:

- Electrically controls a mechanical movement device (e.g., linear positioner, rotary motor, or pump)
- Selectively controls an electrical element to vary—and maintain—its electrical resistance, inductance, and/or capacitance.
- Compatible with high fields (e.g., magnetic field of one tesla or more, ten tesla or more, and/or an electric field of thousands of volts per meter)

### APPLICATIONS:

- High magnetic fields
- Resistance, inductance and capacitance (R-L-C) technology
- Linear positioners
- Rotary motors
- Pumps

**Phase of Development** - Prototype development

### Researchers

Tommy Vaughan, PhD

*Professor, Biomedical Engineering, Columbia University*

### Technology ID

20120121

### Category

Engineering & Physical  
Sciences/Design Specifications  
Engineering & Physical  
Sciences/MRI & Spectroscopy  
Life Sciences/MRI &  
Spectroscopy

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