WHAT IS CLAIMED IS:

1. A method for transmitting radio frequency pulses for a single-sided magnetic imaging apparatus, wherein an inherent gradient magnetic field extends from the magnetic imaging apparatus relative to a first axis into the field of view, and wherein the method comprises:

applying a first sweeping frequency pulse having a first duration and a first sweep rate, wherein the first sweeping frequency pulse defines an X axis;

applying a second sweeping frequency pulse having a second duration and a second sweep rate, wherein the second sweeping frequency pulse defines a first Y axis;

applying a third sweeping frequency pulse having a third duration and a third sweep rate, wherein the third sweeping frequency pulse defines a second Y axis; and

applying a fourth sweeping frequency pulse having a fourth duration and a fourth sweep rate, wherein the fourth sweeping frequency pulse defines a –X axis, and wherein the fourth sweep rate is less than the third sweep rate.

2. The method of Claim 1, wherein the first sweeping frequency pulse comprises a first 90 degree pulse configured to rotate the magnetization to a transverse plane for the first duration, wherein the second sweeping frequency pulse comprises a first 180 degree pulse configured to invert the magnetization to rewind any phase accumulated during the time it spends in the transverse plane, wherein the third sweeping frequency pulse comprises a second 180 degree pulse configured to invert the magnetization to rewind any phase accumulated during the time it spends in the transverse plane, and wherein the fourth sweeping frequency pulse comprises a second 90 degree pulse configured to rotate the magnetization back to the first axis.

3. The method of Claim 1, wherein the sweep rates comprise linear rates.

4. The method of Claim 1, wherein the fourth sweep rate is half the third sweep rate.

5. The method of Claim 1, wherein the sweep rate of each pulse is constant.

6. The method of Claim 1, wherein the first sweep rate is fixed and increases the frequency of the radio frequency pulse from negative to positive.

7. The method of Claim 1, wherein at least two of the first duration, the second duration, the third duration, and the fourth duration are the same.

8. The method of Claim 1, wherein at least two of the first sweep rate, the second sweep rate, third sweep rate, and the fourth sweep rate are the same.

9. The method of Claim 1, wherein the first sweeping frequency pulse comprises a first excitation pulse, wherein the second sweeping frequency pulse comprises a first refocusing pulse, wherein the third sweeping frequency pulse comprises a second refocusing pulse, and wherein the fourth sweeping frequency pulse comprises a second excitation pulse.

10. The method of Claim 1, wherein the first frequency sweeping pulse, the second frequency sweeping pulse, the third frequency sweeping pulse, and the fourth frequency sweeping pulse define a frequency of between 1 Megahertz and 21 Megahertz.

11. The method of Claim 1, wherein the magnetic field strength in the field of view is less than 1 Tesla, and wherein the inhomogeneity of the magnetic field is between 200 ppm and 200,000 parts per million.

12. A magnetic imaging apparatus, comprising:

a permanent magnet comprising a face;

a gradient coil set;

an electromagnet;

a radio frequency coil, wherein an inherent gradient magnetic field extends from the magnetic imaging apparatus relative to a first axis into the field of view, wherein the first axis is perpendicular to the face of the permanent magnet; and

a control circuit configured to control the radio frequency coil to:

apply a first sweeping frequency pulse having a first duration and a first sweep rate, wherein the first sweeping frequency pulse defines a second axis that is orthogonal to the first axis;

apply a second sweeping frequency pulse having a second duration and a second sweep rate, wherein the second sweeping frequency pulse defines a third axis that is orthogonal to the first axis and to the second axis;

apply a third sweeping frequency pulse having a third duration and a third sweep rate, wherein the third sweeping frequency pulse defines the third axis; and

apply a fourth sweeping frequency pulse having a fourth duration and a fourth sweep rate, wherein the fourth sweeping frequency pulse defines the negative second axis, wherein the fourth sweep rate is less than the third sweep rate.

13. The magnetic imaging apparatus of Claim 12, wherein the first sweeping frequency pulse comprises a 90 degree pulse configured to rotate the magnetization to a transverse plane for the first duration, wherein the second sweeping frequency pulse comprises a first 180 degree pulse configured to invert the magnetization to rewind any accumulated phase, wherein the third sweeping frequency pulse comprises a second 180 degree pulse configured to invert the magnetization to rewind any accumulated phase, and wherein the fourth sweeping frequency pulse comprises a second 90 degree pulse configured to rotate the magnetization back to the first axis.

14. The magnetic imaging apparatus of Claim 12, wherein the first sweeping frequency pulse defines an X axis, wherein the second sweeping frequency pulse and the third sweeping frequency pulse define a Y axis, and wherein the fourth sweeping frequency pulse defines a –X axis.

15. The magnetic imaging apparatus of Claim 12, wherein the fourth sweep rate is half the third sweep rate.

16. The magnetic imaging apparatus of Claim 12, wherein the sweep rates are constant throughout each pulse.

17. The magnetic imaging apparatus of Claim 12, wherein the first frequency sweep rate increases the frequency from high to low.

18. The magnetic imaging apparatus of Claim 12, wherein at least two of the first duration, the second duration, the third duration, and the fourth duration are the same.

19. The magnetic imaging apparatus of Claim 12, wherein at least two of the first sweep rate, the second sweep rate, third sweep rate, and the fourth sweep rate are the same.

20. The magnetic imaging apparatus of Claim 12, wherein the first sweeping frequency pulse comprises a first excitation pulse, wherein the second sweeping frequency pulse comprises a first refocusing pulse, wherein the third sweeping frequency pulse comprises a second refocusing pulse, and wherein the fourth sweeping frequency pulse comprises a second excitation pulse.

21. The magnetic imaging apparatus of Claim 12, wherein the radio frequency coil is configured to transmit pulses having a frequency between 1 Megahertz and 21 Megahertz.

22. The magnetic imaging apparatus of Claim 12, wherein the magnetic field strength in the field of view is less than 1 Tesla, and wherein the inhomogeneity of the magnetic field is between 200 ppm and 200,000 ppm.

23. The magnetic imaging apparatus of Claim 12, wherein the radio frequency coil comprises a radio frequency transmission coil and a radio frequency reception coil.