Good report on coil and magnetic experiment

Introduction.

Current generates magnetic field β of which its direction and magnitude highly depends on the geometry of the coil in which charge flows through. Coils can have different geometric shapes; circular, torus and two circular coils with current flowing in either the same or opposite direction. In such different coil geometry therefore, the magnetic field β can be determined using Ampere’s and Biot-Savart Laws’.

Instruments/apparatus.

- Bar magnet.
- Insulated copper wire Circular and toroidal coil
- Cardboard tube.
- Galvanometer.

Procedure and Observation.

- The insulated copper wire was wrapped around the cardboard tube to form a single circular coil and then connected on each end to the galvanometer.
- The bar magnet was the inserted inside the both the single, double circular and toroidal coil and frequently moved in and out faster and slower. The galvanometer was then used to measure the current variation.

For the single circular coil, the magnetic strength at the center of the circular coil is proportional to the current in it and the number of turns N is related to the graphs slope. Moreover, the magnetic field direction reverses when current flow direction is too reversed.

For an instance when two circular coils and current is flowing in the same direction, a graph showing the qualitative behavior when current flows in same and opposite direction. For toroidal coil, the magnetic field is measured as function of R (radius to the coil) and it decreases as R too decreases. In an ideal situation, torus coil only have their azimuth component of $\overline{\beta}$ being non-zero.

In conclusion therefore, within the uncertainties of the experimental conditions and reaction of elements to such changes, the expected theoretical results might hence differ. The magnetic field generated thus depends largely on the current configuration of the coils used.