CLAIMS

1. A magnet array, which is substantially square in shape and is constructed of at least one pair of linear Halbach magnet arrays and one pair of two-dimensional Halbach magnet arrays arranged in an X-Y plane, wherein the two-dimensional Halbach magnet arrays are disposed at two corners of a first diagonal line of the square, wherein linear Halbach magnet arrays adjacent to one two-dimensional Halbach magnet array have different arrangement directions of magnets therein and the arrangement directions are perpendicular to each other, and wherein one pair of linear Halbach magnet arrays are disposed at two corner of a second diagonal line of the square.

2. The magnet array of claim 1, wherein the two-dimensional Halbach magnet arrays each comprise: N magnets; and S magnets and H magnets, both arranged around the N magnets.

3. The magnet array of claim 2, wherein the N magnets and S magnets in the two-dimensional Halbach magnet arrays are square in shape, and wherein the H magnets are magnetized toward the S magnets.

4. The magnet array of claim 3, wherein the two-dimensional Halbach magnet arrays further comprise triangular N magnets or S magnets disposed outermost in the two-dimensional Halbach magnet arrays.

5. The magnet array of claim 2, wherein the N magnets and S magnets in the two-dimensional Halbach magnet arrays are octagonal in shape.

6. The magnet array of claim 5, wherein the two-dimensional Halbach magnet arrays further comprise N magnets or S magnets which are either in a shape of a half of an octagon or in a shape of a quarter of an octagon and are disposed outermost in the two-dimensional Halbach magnet arrays.

7. The magnet array of claim 5, wherein the N magnets and S

magnets are densely arranged, and wherein the H magnets are filled in gaps left after the N magnets and S magnets have been arranged.

8. The magnet array of claim 5, wherein the H magnets are arranged between the N magnets and S magnets as well as in gaps left after the N magnets and S magnets have been arranged.

9. The magnet array of claim 7 or 8, wherein the H magnets between the N magnets and S magnets are magnetized toward the S magnets, and wherein the H magnets in the gaps left after the N magnets and S magnets have been arranged are each magnetized toward a corresponding one of the S magnets at an angle of 45 degrees with respect to both of the X and Y directions.

10. The magnet array of claim 1, wherein the at least one pair of linear Halbach magnet arrays comprises a pair of first magnet arrays and a pair of second magnet arrays, and wherein magnets in the second magnet arrays are longer than magnets in the first magnet arrays.

11. The magnet array of claim 10, wherein in the X-Y plane, magnets arranged at centers of the respective two-dimensional Halbach magnet arrays have a same polarity as magnets arranged at centers of the respective first and second magnet arrays.

12. The magnet array of claim 10, wherein each of the first and second magnet arrays is constructed of N magnets, S magnets and H magnets between the N and S magnets, and wherein the N magnets, S magnets and H magnets are arranged parallel to one another.

13. The magnet array of claim 1, wherein a number of the linear Halbach magnet arrays is same as a number of the two-dimensional Halbach magnet arrays, and wherein the linear Halbach magnet arrays and the

two-dimensional Halbach magnet arrays are put together to form a square.

14. A magnet array, which is a square magnet array formed by arranging a plurality of magnet arrays as defined in claim 1 along the X and Y directions.

15. A magnetically levitated planar motor, comprising: the magnet array as defined in claim 1 or 14; and a coil array disposed under the magnet array.

16. The magnetically levitated planar motor of claim 15, further comprising a back iron arranged on the magnet array.

17. The magnetically levitated planar motor of claim 15, wherein the coil array comprises first coils for producing forces in the X direction and second coils for producing forces in the Y direction, and wherein the first and second coils are stacked one above another and wired in crossed directions.

18. The magnetically levitated planar motor of claim 15, wherein the coil array is a printed circuit board (PCB) coil array.

19. The magnetically levitated planar motor of claim 17, wherein insulators are inter-posed between the first and second coils.

20. The magnetically levitated planar motor of claim 15, wherein the magnet array acts as a mover and the coil array acts as a stator, and wherein the stator is wired with a phase-to-phase spacing of $4\tau/3$, wherein a pole pitch between adjacent N and S magnets in the linear Halbach magnet arrays in the magnet array is equal to a pole pitch between adjacent N and S magnets in the two-dimensional Hal-bach magnet arrays and is represented by τ.