WHAT IS CLAIMED

1. A radial flow chromatography column comprising:

a radial flow chromatography column having a bed length of about 3 cm to about 50 cm,

a plurality of beads~~, with each bead comprising one or more pores therein~~ packed in the radial flow chromatography column, and unclogged interstitial channels formed between the beads,

wherein each bead comprises one or more pores, and each pore has a diameter of about 250 Å to about 5000 Å,

wherein at least about 80% of the plurality of beads have a diameter of about 200 µ~~p~~m to about 500 µ~~p~~m and

wherein the beads have an average radius R of about 100 µ~~p~~m to about 250 µ~~p~~m~~.~~, and

wherein the beads have an average radius R of about 100 µm to about 250 µm, and
wherein the beads maintain their size and morphology under flow rates to 10 column volumes per minute,

wherein the beads are monodisperse wherein all beads have a radius of ± about 10% of a targeted or labeled radius and smaller beads having a radius r<0.225 R have been removed prior to packing the column, and

wherein the system provides for purifying a particle of interest by direct filtration from an unclarified feed stream or crude biological feed stream.

2. The radial flow chromatography column system of claim 1, wherein the bead is made of a polymer, glass, alumina, silica, controlled pore glass (CPG), cellulose, encapsulated iron particles, encapsulated CPG, or encapsulated silica.

3. The radial flow chromatography column system of claim 2, wherein the bead is a polymer bead.

4. The radial flow chromatography column system of claim 1~~any of the preceding claims~~, wherein any beads having r < 0.414 R have been removed.

~~5. The radial flow chromatography column of any of the preceding claims, wherein any beads having r < 0.225 R have been removed.~~

~~6~~5. The radial flow chromatography column system of claim 1~~of any of the preceding claims~~, wherein the interstitial channels have: a tetrahedron site radius r_{tet} = 0.225 R, an octahedron site radius r_{oct} = 0.414 R, or both.

6. The radial flow chromatography column system of claim 1, wherein the interstitial channels have a narrowest channel radius r_{cha}=0.155 R.

7. ~~The radial flow chromatography column of any of the preceding claims, wherein the interstitial channels have a narrowest channel radius r_{c}ha= 0.155 R.~~ The radial flow chromatography column system of claim 1, wherein the particle of interest is a protein, virus, VLP, DNA, RNA, antigen, liposome, oligo- or polysaccharide, or any combination thereof.

~~8. The radial flow chromatography column of any one of claims 1 through 3, wherein the beads are monodisperse.~~

~~9~~8. A process for selecting beads for use in a radial flow chromatography column of claim 1 comprising: a) identifying a narrow desirable bead radius R range based on the components present in the feed stream; b) removing beads of a defined radius r, which are outside of the desirable bead range; and c) defining the percentage of bead radius R within the desirable bead range.

~~10~~9. The process of claim ~~9~~8, wherein the bead is made of a polymer, glass, alumina, metal or ~~other~~ other crystalline, semi-crystalline or amorphous material, silica, controlled pore glass (CPG), cellulose, encapsulated iron particles, encapsulated CPG or encapsulated silica.

~~11~~10. The process of claim ~~9~~8, wherein the bead is a polymer bead.

~~12~~11. The process of ~~any one of claims 9 through 11~~ claim 8, wherein the beads of radius r are removed by wet or dry sieving, and/or elutriation.

~~13~~12. The process of ~~any one of claims 9 through 11~~ claim 8, wherein beads having radius r < 0.414 R are removed.

~~14. The process of claim 13, wherein beads having radius r < 0.225 R are removed.~~

~~15~~13. A process for purifying an unclarified feed stream using the radial flow

chromatography column of claim 1 comprising the steps of:

a. packing the radial flow column with the beads;

b. processing a clarified feed stream containing a particle of interest to calibrate purification conditions;

c. determining the binding of the particle of interest from the results of step b;

d. processing an unclarified feed stream comprising the particle of interest.

~~16~~14. The process of claim ~~15~~13, wherein the particle of interest is a protein, vims, VLP, DNA, RNA, antigen, liposome, oligo- or polysaccharide, or any combination thereof.

15. A radial flow chromatography filtration system for isolating one or more particle of interest comprising:

a radial flow chromatography column having a bed length of about 3 cm to about 50 cm,

a plurality of beads packed in the radial flow chromatography column,

unclogged interstitial channels formed between the beads, and

an unclarified feed stream comprising a plurality of particles;

wherein each bead comprises one or more pores therein, and each pore has a diameter of about 250 Å to about 5000 Å,

wherein at least about 80% of the plurality of beads have a diameter of about 200 µm to about 500 µm,

wherein the beads have an average radius R of about 100 μm to about 250 μm,

wherein the beads maintain their size and morphology under flow rates to 10 column volumes per minute,

wherein the beads are monodisperse wherein all beads have a radius of ± about 10% of a targeted or labeled radius and smaller beads having a radius r<0.225 R have been removed prior to packing the column, and

wherein the diameter of each of the interstitial channels is about **3** to about **10**-fold larger than the largest particle in the unclarified feed stream.

16. The radial flow chromatography filtration system of claim 15, wherein the bead is made of a polymer, glass, alumina, silica, controlled pore glass (CPG), cellulose, encapsulated iron particles, encapsulated CPG, or encapsulated silica.

17. The radial flow chromatography filtration system of claim 16, wherein the bead is a polymer bead.

18. The radial flow chromatography filtration system of claim 15, wherein the particle of interest is a protein, virus, VLP, DNA, RNA, antigen, liposome, oligo- or polysaccharide, or any combination thereof.

19. A process for selecting beads for use in the radial flow chromatography column of claim 15 comprising: a) identifying a narrow desirable bead radius R range based on the components present in the feed stream; b) removing beads of a defined radius r, which are outside of the desirable bead range; and c) defining the percentage of bead radius R within the desirable bead range.

20. The process of claim 19, wherein the bead is made of a polymer, glass, alumina, metal or other crystalline, semi-crystalline or amorphous material, silica, controlled pore glass (CPG), cellulose, encapsulated iron particles, encapsulated CPG or encapsulated silica.

21. The process of claim 19, wherein the bead is a polymer bead.

22. The process of claim 19, wherein the beads of radius r are removed by wet or dry sieving, and/or elutriation.

23. The process of claim 19, wherein beads having radius r<0.414 R are removed.