and the sorters. The conduit network may include tubing, channels formed in or on a generally planar or three-dimensional channel structure, and/or a combination thereof, among others. The conduit network may include a set of parallel passages that extend from the input reservoir to the sorters, passages that increase in number or branch toward the sorters, or a combination thereof. For example, in the present illustration, conduit network **28** carries portions of mixture **24** in parallel through a single conduit **42** that branches to a plurality of conduits **44** equal in number to the number of sorters. The conduit network may be defined by a manifold, as described below.

[**0019**] An output receiver structure may be any vessel or compartment for receiving fluid and sorted particles from the sorters. Exemplary receiver structures may include microplate wells, microfluidic compartments of a chip, test tubes, culture vessels, etc. In some embodiments, each sorter may direct sorted particles to a separate receiver structure, for example, to perform post-sorting processing. The post-sorting processing may include cell culture, cell lysis, and/or molecular analysis (sensing) of cellular or particle constituents (such as analysis of a nucleic acid, protein, lipid, ion, carbohydrate, etc.). In an exemplary embodiment, post-sorting processing may include cell lysis followed by amplification of a nucleic acid.

[**0020**] An input mixture may include any particle mixture of interest. Particles, as used herein, may include any set of discrete, small objects. For example, the particles may be less than about 100 micrometers in diameter, and may be biological, synthetic, naturally occurring, organic, inorganic, or a combination thereof. Exemplary particles may include cells. The cells may be alive or dead, fixed or unfixed, processed or unprocessed, cultured or noncultured, and/or the like. Exemplary cells may include eukaryotic cells and/or bacteria. Other exemplary particles may include viruses, organelles, vesicles, synthetic polymers, beads, coded beads carrying biomolecules, magnetic particles, and/or the like. Exemplary sources for particle mixtures may include a patient sample (such as blood, a tissue biopsy, mucus, saliva, urine, sperm, tears, sweat, etc.), an environmental sample (such as a sample from water, air, soil, etc.), and/or a research sample, among others.

[**0021**] The input mixture may be preprocessed before sorting. For example, the input mixture may be treated to make a subset of the particles optically distinguishable. In some embodiments, the mixture may be treated with a dye to selectively label a subset of the particles. The dye may be any optically detectable material. The dye may bind directly to the particles or bind through a coupled (covalently or noncovalently) specific binding member, such as an antibody, a lectin, a molecular imprinted polymer, a nucleic acid, a receptor, a ligand, etc. Alternatively, or in addition, the input mixture may be cells that have been engineered, such as by transfection, to express an optically detectable material, such as green fluorescent protein.

[**0022**] **FIG. 2** shows an example of a sorter unit **50** that may be included in system **20**. Sorter unit **50** may include a channel structure **52** defining at least one channel **54**. Channel structure **52** may be any structure that defines a passage along which particles (and fluid **53**) may be transported. The passage may be any predefined path for particle/fluid travel. In addition, the passage may include walls and/or a particle guiding and/or fluid guiding surface characteristic, such as adjacent hydrophobic and hydrophilic surface regions. The channel structure may support the particles by supporting fluid in which the particles are disposed. Supported fluid, as used herein, is fluid that is in contact with a solid surface so that the fluid is restricted from falling. By contrast, unsupported fluid may include airborne fluid droplets. In some embodiments, the channel structure may be a substrate assembly including a substrate and a fluid barrier connected to the substrate, as described further below.

[**0023**] Channel **54** may include an inlet **56** at which a stream **58** of particles **60**, **62** may be received, and first and second outlets **64**, **66** to which the particles may travel. Accordingly, channel **54** may be described as a branched channel because particles and/or fluid may travel along two or more different paths **68**, **70** through the channel.

[**0024**] Sorter unit **50** also may include a sensor **72** configured to sense a property of each particle **60**, **62**. The sensor may be an optical sensor that measures an optical (or electromagnetic) property of each particle, such as a luminescence (photoluminescence (for example, fluorescence or phosphorescence), chemiluminescence, or bioluminescence), scattering, absorbance, refraction, reflection, and/or polarization, among others. Alternatively, the sensor may be an electrical or magnetic sensor, configured to sense an electrical or magnetic property of the particles, respectively.

[**0025**] Sensor **72** may have any suitable size, shape, location, and structure. In some embodiments, the sensor may be longer than the diameter of the particles, that is, long enough to sense a particle at a plurality positions along the channel, for example, to measure the velocity of the particle. Accordingly, the sensor may be a single sensor or a plurality of sensor elements, which may be arrayed, for example, along the channel. The sensor also may have any suitable width including a width substantially similar to the width of the channel. The sensor may be formed on or below a surface of the channel, for example, one or more photodiodes formed on or in a substrate that defines a floor of the channel. The photodiodes may be configured to receive light selectively. Accordingly, they may be coated with a photoselective material, such as a filter layer that selectively permits the passage of particular wavelengths of light.

[**0026**] Sorter unit **50** may include, and/or function with, a plurality of mechanisms for moving particles and/or fluid, such as nonselective and selective transport mechanisms **74** and **76**, respectively.

[**0027**] Nonselective transport mechanism **74** may be any mechanism(s) for moving input particles relatively nonselectively through channel **54**. The nonselective transport mechanism may exert a similar force on different types of particles in a particle mixture so that they travel with a similar velocity. Alternatively, the nonselective transport mechanism may exert dissimilar forces so that different particles travel with different velocities. However, in either case, the nonselective transport mechanism moves the particles through the channel. The nonselective transport mechanism may be a continuous transport mechanism. A continuous transport mechanism, as used herein, may be any transport mechanism that moves a plurality of particles through the channel without substantial interruption.

[**0028**] In the present illustration, nonselective transport mechanism **74** sends a stream **58** of particles **60**, **62** into and