216 in an off-state and a device **218** in an on-state. The off-state indicates an inactive state while an on-state means an active state. Device **216** or **218**, in one embodiment, is a plasma actuator. It should be noted that the underlying concept of the exemplary embodiment of the present invention would not change if additional layer were added to or removed from diagram **200**.

[0042] Device **216** includes a touch surface **202**, a substrate **204**, and a separation gap **206**, wherein gap **206** is configured to facilitate plasma actuation. In one aspect, touch surface **202** is a deformable touch-sensitive surface capable of detecting one or more events. An event includes a contact, a depression, a motion, a surrounding condition, or the like. Gap **206** is situated between touch surface **202** and substrate **204** for housing plasma. In one example, gap **206** is divided into multiple air pockets for housing a portion of plasma in each pocket. The concentration of plasma, for instance, can be different between the pockets within gap **206**. Substrate **204** facilitates and generates plasma in gap **206** and is also known as a plasma substrate. To facilitate and increase plasmatic gas, substrate **204** is connected with a power supply, which can either be a battery or an AC (alternating current) power outlet.

[0043] Device **218** includes a user's hand **208**, a deformable touch surface **202**, a substrate **204**, and a separation gap **206** wherein gap **206** is configured to facilitate actuation. It should be noted that device **218** is an active state or on-state of device **216**. When the index finger of user's hand **208** presses on the top of touch surface **202**, touch surface **202** deforms in response to finger pressure **212**. Finger contact or pressure **212**, in one embodiment, activates or triggers a device from an inactive state to an active state. When touch surface **202** deforms, the distance between touch surface **202** and substrate **204** at the point of finger pressure **212** reduces from distance **214** to distance **213**. The shortened distance **213** causes an energy transfer **210** from substrate **204** to touch surface **202** via a plasma channel in gap **206**. As such, a haptic response at finger pressure **212** is generated in response to energy transfer **210**. Different chemical composition of plasma in gap **206** triggers different amount of energy transfers. Different amount of energy transfer leaping from substrate **204** to touch surface **202** renders different types of haptic response.

[0044] In an alternative embodiment, gap **206** can be divided into multiple air pockets for housing plasma, wherein plasma at each pocket can perform an energy transfer independent from plasma located at adjacent pocket(s). It should be noted that depending on the applications, the index finger of user's hand **208** can be replaced with any applicable objects, such as a stylus, a pen, a pointed instrument, and the like. Note that a person of skill in the art is aware that plasma, often referred to as ionized gas, is electrically conductive.

[0045] Referring back to FIG. **2**(*a*), a mechanical representation of a deformable surface **202** is similar to snap-dome button switch, which triggers a reaction when the surface of the button is deformed enough to actuate the switch. In one aspect, plasma or plasma gas or plasma cloud is capable of moving from one side of switch or device to other side (to the actuation surface) directly under the point of surface contact **212** for energy discharge and/or static discharge. It should be noted that the bottom of touch surface **202** acts as one half of the haptic feedback generator switch with the second half of the generator switch laying closely below it so as to act as an open circuit. Haptic actuation occurs when the two halves of the circuit connected by a leap of current from one side of the switch to the other. For example, lead current or energy transfer **210** travels from substrate **204** to touch surface **202** as a closed circuit when a conductive channel of plasma is formed. The haptic actuation can vary based on the amount of pressure placed on the touch surface and/or the amount of surface area covered by the users' interaction. It should be noted that the variation of the actuation in the resultant of the haptic response (such as increased effect amplitude) is not necessary for device **218** to work.

[0046] FIG. **2**(*b*) is a diagram **220** illustrating a cross section view of haptic device capable of generating haptic feedback using plasma actuator in accordance with one embodiment of the present invention. Diagram **220** shows a device **236** in an off-state and a device **238** in an on-state. The off-state indicates an inactive state while the on-state means an active state. Device **236** or **238** can be a plasma actuator. It should be noted that the underlying concept of the exemplary embodiment of the present invention would not change if additional layer were added to or removed from diagram **220**.

[0047] Device **236**, similar to diagram **216** illustrated in FIG. **2**(*a*), includes a touch surface **222**, a substrate **224**, and a separation gap **226**, wherein gap **226** is configured to facilitate actuation. In one aspect, touch surface **222** is a capacitive sensitive or a pressure-sensing surface capable of detecting an event. Gap **226**, in one embodiment, is situated between touch surface **222** and substrate **224** for housing plasma. In one example, gap **226** is divided into multiple air pockets for housing plasma. The concentration of plasma, for instance, can be different between the pockets. Substrate **224** is coupled to a power supply and generates plasma in gap **226**. An advantage of dividing gap **226** into pockets is to control the amount of energy that can be transferred.

[0048] Device **238** includes a user's hand **228**, a solid capacitance sensitive touch surface **222**, a substrate **224**, and a separation gap **226** wherein gap **226** is configured to facilitate actuation. In one aspect, touch surface **222** can also be a resistive sensitive touch surface, a temperature sensitive touch surface, a motion sensitive surface, and so forth. It should be noted that device **238** is an active state or on-state of device **236**. When the index finger of hand **228** touches, contacts, or presses on the top of touch surface **222**, touch surface **222** detects capacitance change due to finger capacitance at a contact or interactive point **232**. Note that the finger contact at point **232** triggers or activates device **238**. Upon detecting the change of capacitance or contact capacitance at contact point **232**, conductive carriers within plasma are drawn to a region **234**. As such, a plasma channel is formed at region **234** when concentration of conductive carriers in plasma at region **234** reaches at a conductive level.

[0049] In other words, when sufficient conductive carriers in gap **226** are aggregated at a region **234** in response to the finger contact, a plasma conductive channel is formed at region **234**. After formation of the plasma conductive channel, an energy transfer **230** takes place. When energy or current travels from substrate **224** to touch surface **222** through plasma channel at region **234**, a haptic response acknowledging the finger contact is generated. Depending on chemical compositions of plasma as well as concentrations of conductive plasma carriers in gap **226**, different types of haptic feedback can be generated. It should be noted that gap **226** can be divided into multiple air pockets for housing a portion of plasma, wherein plasma at each pocket can transfer energy independent from plasma located at the adjacent pocket(s).