[0024] Lens **10** is mounted on a support element **15** to which a reference mirror $16_{rx}$ for interferometric X position determination of measurement table **4** is attached. It is located at a fixed distance from optical axis **11** of lens **10**. A reference mirror $16_{ry}$, which is not depicted in this Figure, is also mounted for interferometric position determination of the Y axis. Proceeding from interferometer **26**, a reference beam $17_{rx}$ for the X axis is directed onto reference mirror $16_{rx}$, and a reference beam $17_{ry}$ for the Y axis is directed onto reference mirror $16_{ry}$. A position detector **20** is provided on support element **15** in optical axis **11**. This position detector **20** can be configured in the form of a CCD camera or a brightness detector. Also joined to support element **15** is a focus position transducer **22** which indicates the focus position of lens **10** relative to substrate **9** and which monitors and regulates the focusing of lens **10** on the substrate surface. Arranged on support element **15** alongside lens **10** is a nonoptical measurement device **23**, which in the exemplary embodiment described here is configured as AFM **24**. AFM **24** is used for fine measurement of features **19** on the mask surface. With lens **10**, it is possible to optimize throughput by maximally limiting the measurement region of the AFM system in terms of extent (by way of a measurement window) and also in terms of height (by way of a focus range). A fine measurement of the entire surface of substrate **9** with the AFM would be much too time-consuming. Only with a rigid coupling between the sensing systems and the interferometer mirrors $13_{mx}$, $13_{my}$, $16_{mx}$, and $16_{my}$ can positions be measured exactly, so that AFM **24** can be exactly positioned in the optically located measurement window.

[0025] In a second exemplary embodiment, as depicted in **FIG. 2**, substrate **9** is illuminated with incident light and the refined measurement is also performed using AFM **24**. For the sake of simplicity, identical reference characters are used for identical components in the various embodiments. An illumination unit **28** for illuminating substrate **9** with incident light is provided on position detector **20**. Provided in position detector **20** is a semitransparent optical element **30** with which the illumination is directed through the lens onto the surface of substrate **9**.

[0026] **FIG. 3** shows the third embodiment of the invention, in which an electron beam lens **40** is provided on support element **15** alongside lens **10**. Electron-optical systems are by now well developed, and electron beam lenses can be made sufficiently small using micropatterning technology. In this exemplary embodiment, nonoptical measurement device **23**, as already mentioned above, is configured in the form of electron beam lens **40**. Electron beam lens **40** constitutes a particularly advantageous combination with lens **10**. A fine measurement using exclusively electron beam lens **40** is possible. With the combination of lens **10** and electron beam lens **40**, charging resulting from the electron beam is minimized, since optical methods are used for the greatest possible portion of the measurement operation (e.g. focusing, fine adjustment of the measurement field, etc.).

[0027] **FIG. 4** shows the fourth exemplary embodiment of the invention. Here again, as already explained in **FIG. 2**, an illumination unit **28** is provided on position detector **20**. This arrangement thus serves to illuminate substrate **9** with incident light.

[0028] Further measurement systems are used in addition to the nonoptical measurement systems described here, for example AFM and electron beam. One of them is, for example, the photon tunneling microscope. Also to be noted is that all the nonoptical measurement systems used are suitable for measuring substrate **9** under normal atmospheric pressure conditions. It is not necessary to enclose the entire measuring instrument **100** with a chamber for evacuation.

[0029] With measurement methods according to the present invention, it is possible with lens **10** to increase and also to optimize the throughput of substrates **9** being measured. In this context, the measurement region of the AFM is maximally limited in terms of extent (by a measurement window) and also in terms of height (by a focus range).

[0030] Only with a rigid coupling of the two measurement systems and of interferometer mirrors $16_{rx}$ and $16_{ry}$ can positions be measured exactly. The AFM is positioned exactly in the optically located measurement window in accordance with the purely optical measurement.

[0031] One possible exemplary embodiment of a measurement method with an AFM is explained below. Lens **10** is moved to substrate **9**. The optical system then focuses on the point on substrate **9** to be measured. The edges to be measured are then localized optically. A coarse position of the feature to be measured is thereby determined. Around this coarse position, a region which then defines the measurement window for AFM **24** is determined. The measurement window is thus defined very tightly around the edge. Measurement table **4** is then moved correspondingly so that the measurement window ends up beneath AFM **24**. In this context, the deviation of measurement table **4** from the coarse position is determined, and thus the exact position and extent of the feature are ascertained. The accuracy of a system having an AFM **24** could be even further enhanced if it were assumed that the tip of AFM **24** is as immovable as possible. Substrate **9** would then need to be scanned by moving measurement table **4**.

[0032] A further exemplary embodiment of a measurement method is implemented by way of the measuring instruments depicted in **FIGS. 3 and 4**. Here AFM **24** of **FIGS. 1 and 2** is replaced by an electron beam lens **40**. The control and regulation electronics necessary for electron beam lens **40** are not explicitly depicted here, since they are comparable to the electronic systems for conventional scanning electron microscopes and are thus sufficiently known to those skilled in the art. The measurement method using an electron beam lens **40** does not necessarily require an additional optical sensing method using lens **10**. Electron beam lens **40** is moved over the surface of substrate **9**, and the positions of the edges of features **19** and the corresponding feature widths are thereby determined. The charging of the surface of substrate **9** caused by the electron beam of electron beam lens **40** is already reduced, not only because electron beam lens **40** is operated with a low voltage, but also because no vacuum is present between the surface of substrate **9** and electron beam lens **40**. The air molecules ionized in that area additionally carry off the excess charge, and thus provide a further reduction in the charging of substrate **9**.

[0033] Here again, however, an advantageous combination with a lens **10** is conceivable. With lens **10**, the surface of substrate **9** could be observed and the corresponding