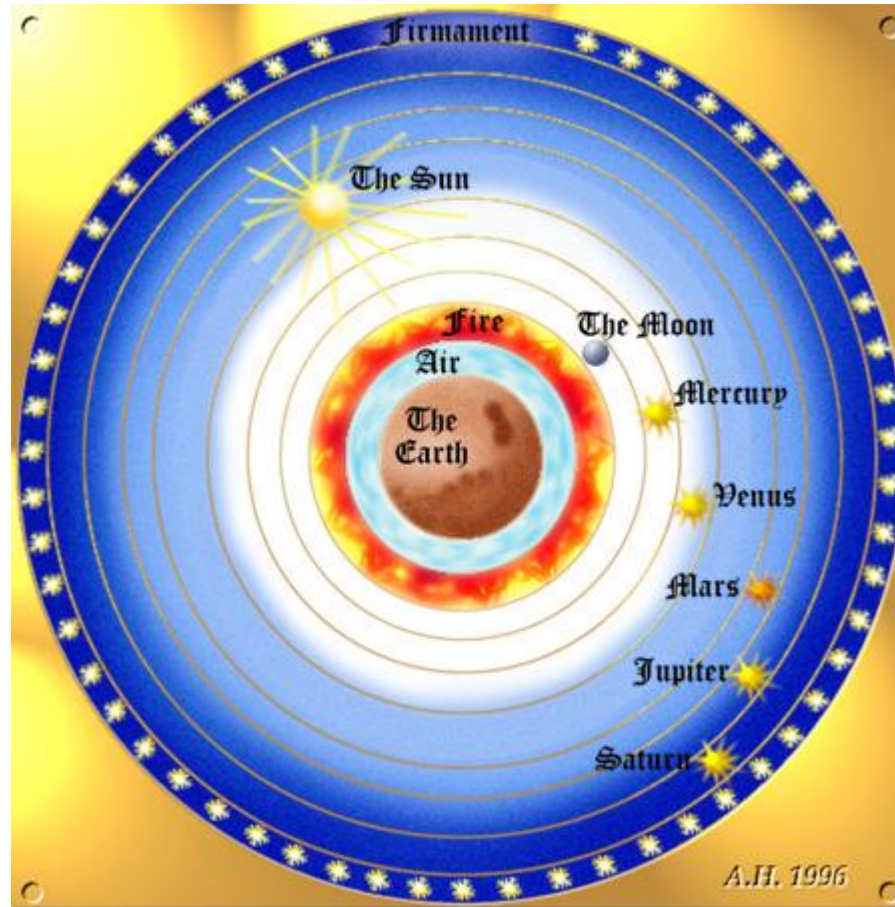


HSTEU 302 SCIENTIFIC REVOLUTION

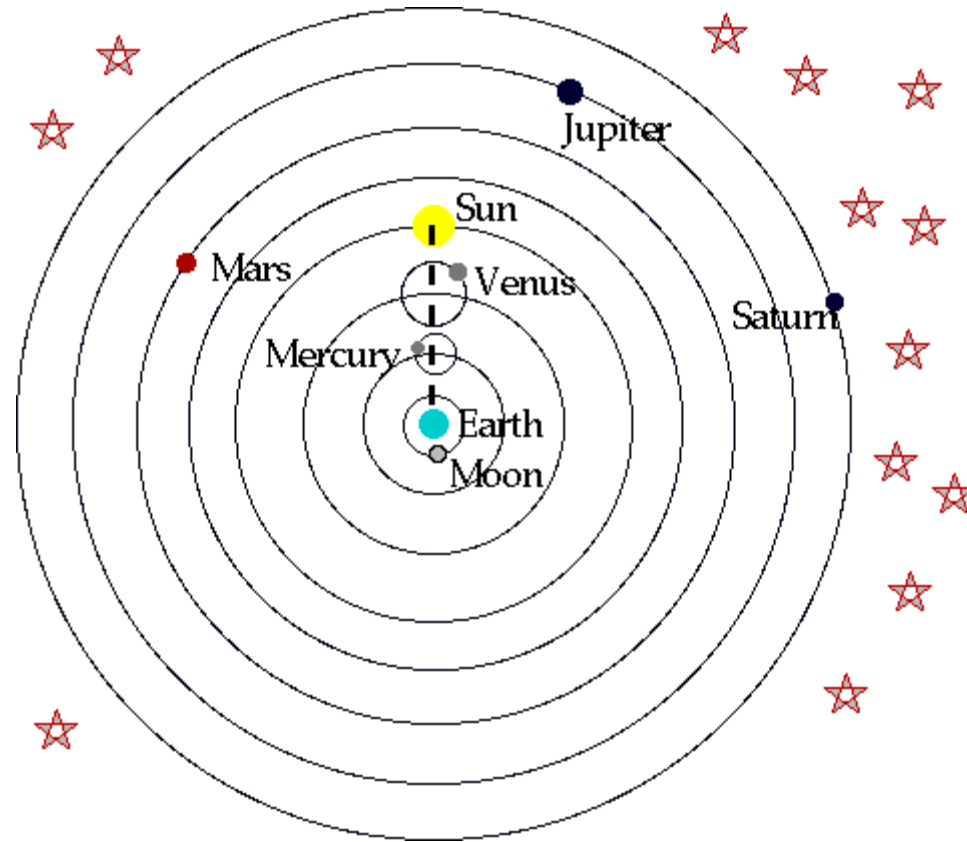


The Two Sphere Universe:

Inner sphere: Earth is stationary in the center

Outer sphere fixed stars rotates around the Earth once a day

Planets “wander” in between these two spheres.



GEOCENTRIC, TRADITIONAL UNIVERSE:

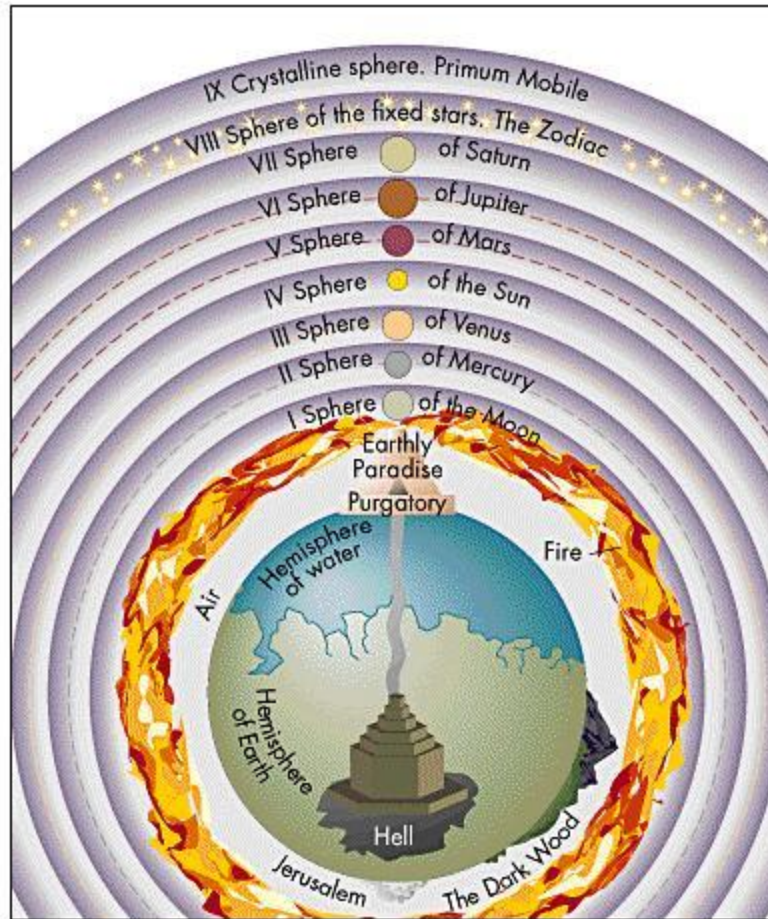


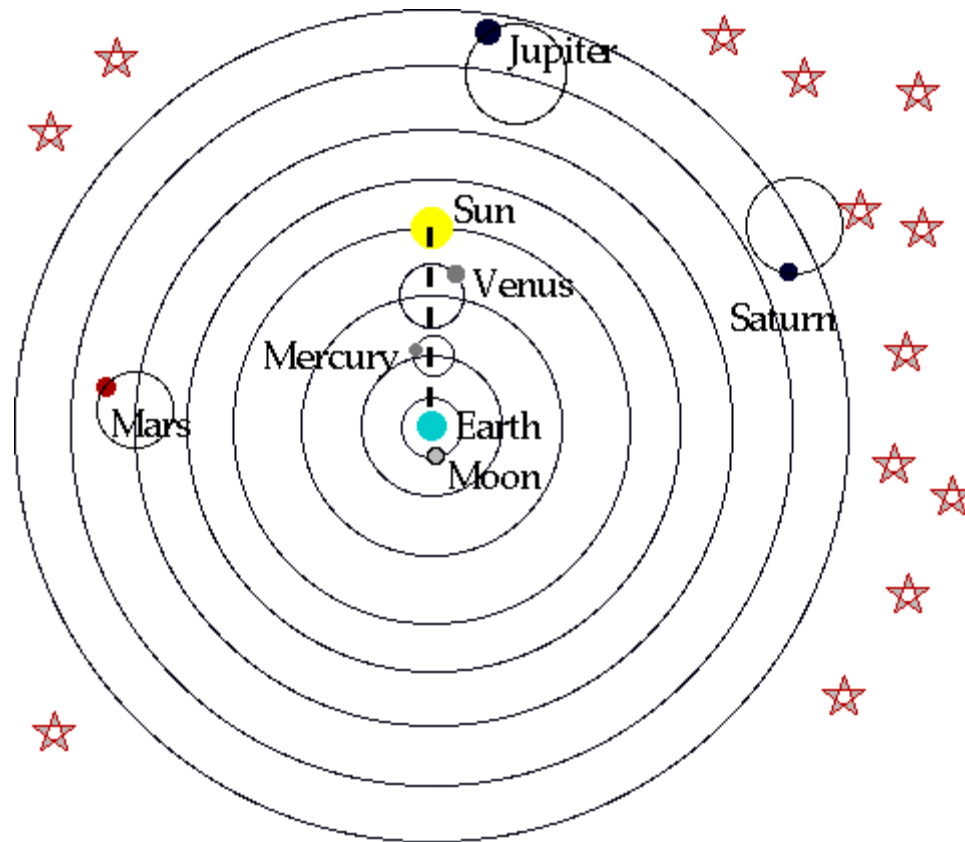
Ptolemaic view of the universe: geocentric, circular orbits

Dante's Universe

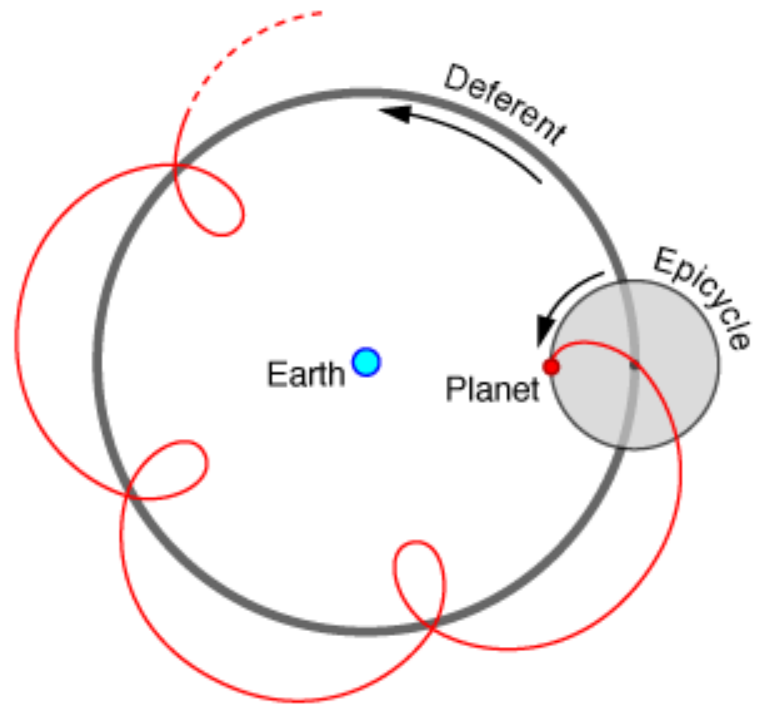
Hell is in the center
of the Earth

Purgatory is a
mountain in the
Atlantic





EPICYCLES: needed to explain observation of planets' motion



Looping orbits of planets as they turn on epicycles

Nicholas Copernicus

On the Revolutions of the Heavenly Spheres

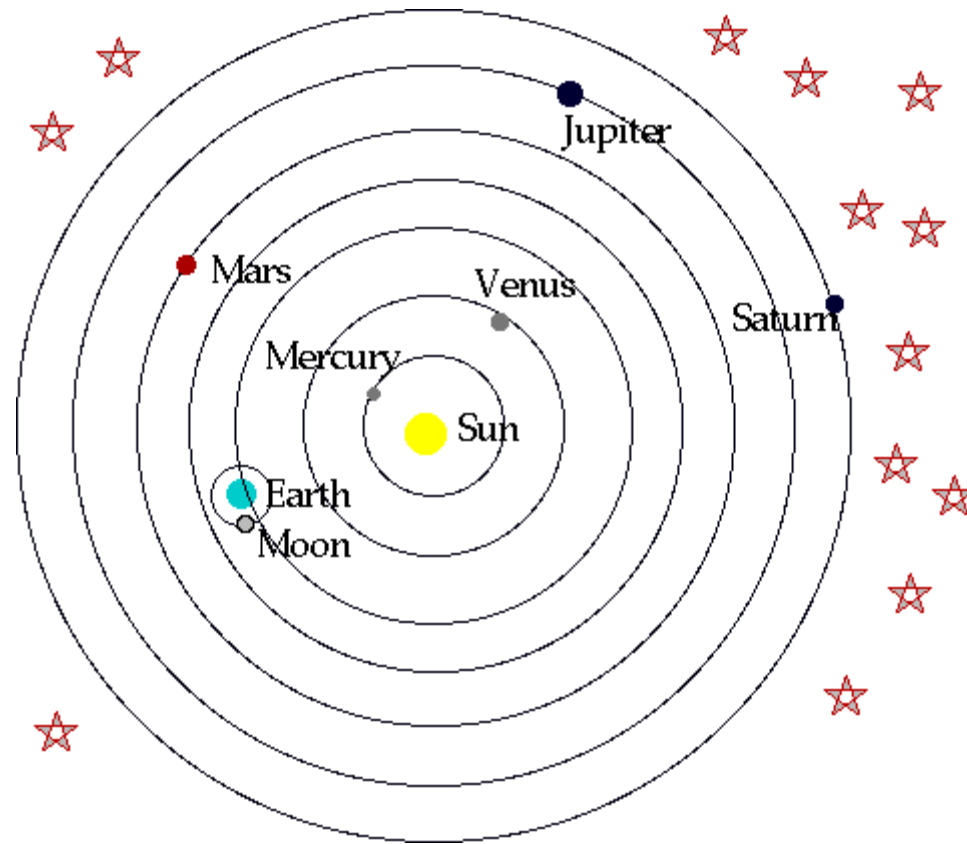
1543

Copernicus died the year his book was published and was never charged with heresy. Text was very mathematical not easy to understand





Copernican system



COPERNICUS: HELIOCENTRIC UNIVERSE

Opposition to heliocentrism:

1) common sense (sun rises, sun sets)

2) Scripture:

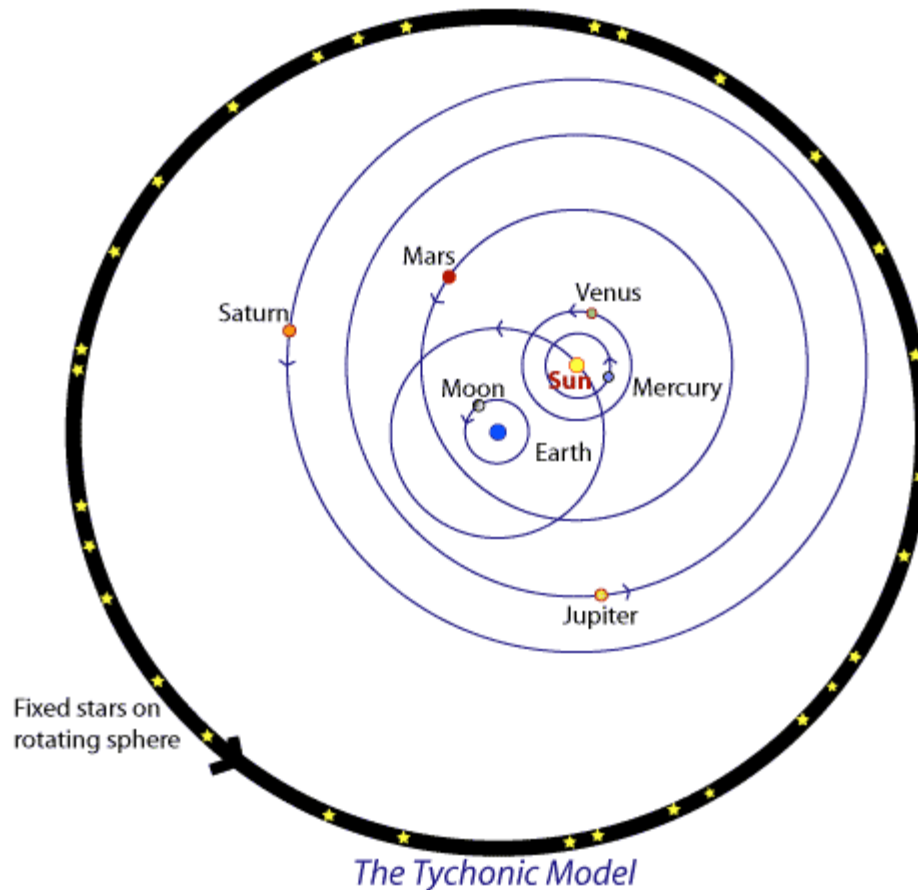
condemned by Protestants & Catholics alike

(Old Testament:

Joshua makes the sun stand still)

3) classical authority of Ptolemy, ancient Greek astronomy

4) threatens entire Christian cosmology
(world view), sense of order



TYCHO BRAHE'S COMPROMISE MODEL

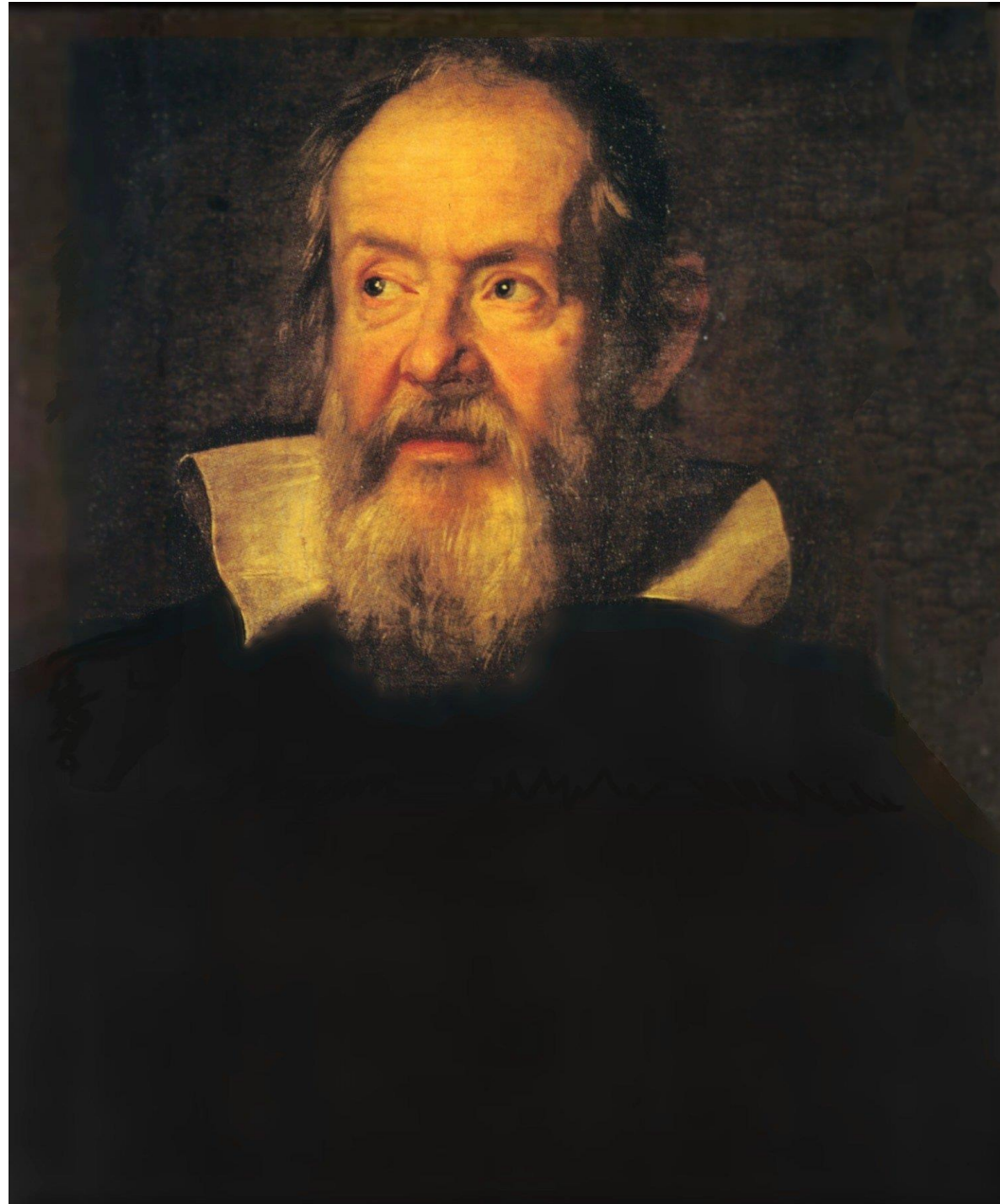
earth central, moon and sun revolve around the Earth
but all the other planets revolve around sun



Tycho Brahe's compromise system

Galileo
Galilei
(1564-1642)
portrait

by
Justus
Sustermans



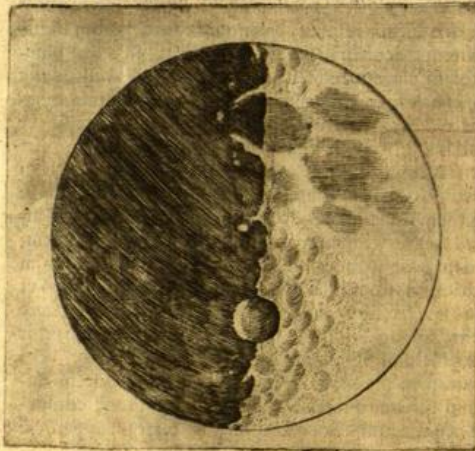
Galileo, *Sidereus Nuncius*, 1610

(The Starry Messenger)

Latin treatise announcing his discoveries with telescope

OBSERVAT. SIDEREÆ

Quam daturam. Depressiores insuper in Luna cernuntur magna macula, quam clariores plagæ; in illa enim tam crescente, quam decrecente semper in lucis tenebrarumque consinio, prominente hinc inde circa ipsas magnas maculas contermini partis lucidioris, veluti in describendis figuris observauimus; neque depressiores tantummodo sunt dictarum macularum termini, sed æquabiliores, nec rugis, aut asperitatibus interrupti. Lucidior verò pars maximè propè maculas eminet; adeo vt, & ante quadraturam primam, & in ipsa fermè secunda circa maculam quandam, superiorem, borealem nempe Lunæ plagam occupantem valdè attollantur tam supra illam, quam infra ingentes quædam eminentiæ, veluti appositæ præferunt delineationes.



Hæc

RECENS HABITÆ

10



Hæc eadem macula ante secundam quadraturam nigrioribus quibusdam terminis circumuallata conspicitur; qui tanquam altissima montium iuga ex parte Soli auersa obscuriores apparent, quæ verò Solem respiciunt lucidiores extant; cuius oppositum in cauitatibus accidit, quarum pars Soli auersa splendens apparet, obscura verò, ac umbrosa, quæ ex parte Solis sita est. Imminuta deinde luminosa superficie, cum primum tota fermè dicta macula tenebris est obducta, clariora motuum dorsa eminenter tenebras scandunt. Hanc duplicem apparentiam sequentes figuræ demonstrant.



DIALOGO
DI
GALILEO GALILEI LINCEO
MATEMATICO SOPRAORDINARIO
DELLO STUDIO DI PISA.
E Filosofo, e Matematico primario del
SERENISSIMO
GR. DVCA DI TOSCANA.

Due ne i congressi di quattro giornate si discorre
sopra i due

MASSIMI SISTEMI DEL MONDO
TOLEMAICO, E COPERNICANO;

*Proponendo indeterminatamente le ragioni Filosofiche, e Naturali
tanto per l'una, quanto per l'altra parte.*

CON PRI



VILEGI.

IN FIRENZA, Per Gio:Batista Landini MDCXXXII.

CON LICENZA DE' SUPERIORI.

Galileo *Dialogue on the Two Chief World Systems* 1632

Galileo Galilei (1584-1642)

astronomy: popularizer of Copernican system

invention of telescope: qualitatively new data:

sees new stars, moons of Jupiter

1632 Dialogue on Two Chief World Systems:

attack on Ptolemy & Aristotle;

defender of Ptolemaic system is named "Simplicius"

public, vernacular defense of heliocentrism

charged with Copernican heresy

1633 trial by Roman Inquisition,

required to recant his errors publicly, denying heliocentrism

and the movement of the Earth

says sotto voce, "Eppure si muove" ("But it does move");

house arrest in Florence

1633 Galileo's Trial before the Roman Inquisition on charges of Copernicanism



Painting by
Joseph-Nicolas Robert-Fleury. *Galileo before the Holy Office*, 1847