Benedetti, Riccardo; **Petronio, Carlo**
Lectures on hyperbolic geometry. (English) Zbl 0768.51018
Universitext. Berlin etc.: Springer-Verlag. xiv, 330 p. (1992).

These polished lecture notes provide a readable account of recent results in hyperbolic geometry, assuming only some facility with Riemannian geometry and algebraic topology. They are organized into six chapters, labeled A through F. The first two chapters treat the basic properties of n-dimensional hyperbolic manifolds, with occasional specialization to the case $n = 2$, culminating in the Fenchel-Nielsen parametrization of Teichmüller space. The third chapter gives a singular chains version of the Gromov-Thurston proof for the Mostow rigidity theorem in the compact case. Chapter D contains a proof of the Margulis lemma and some applications. Chapter E accounts for over a third of the book; it deals with the volume function on the space of n-dimensional hyperbolic manifolds; included are a proof of Wang's theorem ($n \geq 4$) and an account of the Jorgensen-Thurston theory ($n = 3$). Here the authors provide a reorganized proof of Thurston's hyperbolic surgery theorem, avoiding apparent gaps in previous expositions. The final chapter sketches the theory of bounded cohomology, concluding with a section on Sullivan's conjecture and amenable groups. The text includes a spare but useful 2-page subject index, a notation index, and 175 very helpful line drawings.

Reviewer: T.J.Barth (Riverside)

MSC:

51M10	Hyperbolic and elliptic geometries (general) and generalizations	Cited in **4** Reviews
51-02	Research exposition (monographs, survey articles) pertaining to geometry	Cited in **214** Documents
32Q45	Hyperbolic and Kobayashi hyperbolic manifolds	
32-02	Research exposition (monographs, survey articles) pertaining to several complex variables and analytic spaces	
32G15	Moduli of Riemann surfaces, Teichmüller theory (complex-analytic aspects in several variables)	
58B20	Riemannian, Finsler and other geometric structures on infinite-dimensional manifolds	

Keywords:

hyperbolic geometry; Thurston's hyperbolic surgery theorem