1.	Record Nr.	UNINA9910819879803321
	Autore	Barone Vincenzo, Dr.
	Titolo	Transverse spin physics [[electronic resource] /] / Vincenzo Barone, Philip G. Ratcliffe
	Pubbl/distr/stampa	River Edge, N.J., : World Scientific, c2003
	ISBN	1-281-93587-5
		9786611935870
		981-279-551-0
	Descrizione fisica	1 online resource (xii, 294 p.) : ill
	Altri autori (Persone)	RatcliffePhilip G
	Disciplina	539.725
	Soggetti	High spin physics
		Nuclear spin
		Hadrons
	Lingua di pubblicazione	Inglese
	Formato	Materiale a stampa
	Livello bibliografico	Monografia
	Note generali	Bibliographic Level Mode of Issuance: Monograph
	Nota di bibliografia	Includes bibliographical references (p. 277-290) and index.
	Nota di contenuto	ch. 1. Introduction. 1.1. The transverse-spin structure function and the transversity distributions. 1.2. A first look at g2. 1.3. A prelude to transversity. 1.4. Notation and terminology. 1.5. Conventions -- ch. 2. Polarised deeply-inelastic scattering. 2.1. Basics of DIS. 2.2. The unpolarised cross-section. 2.3. Polarised cross-sections. 2.4. Target polarisation. 2.5. Forward virtual Compton scattering. 2.6. Spin asymmetries. 2.7. The partonic content of structure functions. 2.8. Mellin moments of polarised structure functions. 2.9. Experimental results on polarised structure functions. 2.10. Transverse spin in electroweak DIS -- ch. 3. The transverse-spin structure of the proton. 3.1. The quark-quark correlation matrix. 3.2. Leading-twist distribution functions. 3.3. Probabilistic interpretation of distribution functions. 3.4. Vector, axial and tensor charges. 3.5. Quark-nucleon helicity amplitudes. 3.6. The Soffer inequality. 3.7. Transverse motion of quarks. 3.8. Twist-three distributions. 3.9. Sum rules for [symbol] and g[symbol]. 3.10. T-odd distributions. 3.11. Model calculations -- ch. 4. The QCD evolution of transversity. 4.1. The renormalisation-group equation. 4.2. QCD evolution at leading order. 4.3. QCD evolution at next-to-leading order. 4.4. Fragmentation functions at

next-to-leading order. 4.5. Evolution of the transversity distributions. 4.6. Evolution of the Soffer inequality and positivity constraints. 4.7. The low-[symbol] behaviour of h[symbol].
ch. 5. The g2 structure function in QCD. 5.1. The operator-product expansion - non-singlet. 5.2. Ladder-diagram summation. 5.3. Singlet g2 in LO. 5.4. Non-singlet and singlet coefficients g2 in NLO. 5.5. Sum rules for g2 in QCD. 5.6. Low-[symbol] behaviour of g2. 5.7. Twist-three evolution equations in the large-Nc limit. 5.8. Evolution of the g2 fragmentation function -- ch. 6. Transversity in Drell-Yan production. 6.1. Double transverse-spin asymmetries. 6.2. The Drell-Yan process. 6.3. Factorisation in Drell-Yan processes. 6.4. Twist-three contributions to the Drell-Yan process. 6.5. Predictions for Drell-Yan double transverse-spin asymmetries. 6.6. Transversity at RHIC -- ch. 7. Transversity in inclusive leptoproduction. 7.1. Single-particle leptoproduction: definitions and kinematics. 7.2. The partonic description of semi-inclusive DIS. 7.3. The fragmentation matrix. 7.4. Time reversal and transverse polarisation. 7.5. Leading-twist fragmentation functions. 7.6. The Collins fragmentation function. 7.7. Cross-sections and asymmetries of inclusive leptoproduction. 7.8. Factorisation in semi-inclusive DIS. 7.9. Inclusive leptoproduction at twist three. 7.10. Two-particle leptoproduction. 7.11. Leptoproduction of spin-one hadrons. 7.12. Transversity in exclusive leptoproduction processes. 7.13. Phenomenological analyses and experimental results. 7.14. Experimental perspectives -- ch. 8. Transversity in inclusive hadroproduction. 8.1. Inclusive hadroproduction with a transversely polarised target. 8.2. Transverse motion of quarks and single-spin asymmetries. 8.3. Single-spin asymmetries at twist three.

| Sommario/riassunto | This book is devoted to the theory and phenomenology of transverse-spin effects in high-energy hadronic physics. Contrary to common past belief, it is now rather clear that such effects are far from irrelevant. A decade or so of intense theoretical work has shed much light on the subject and brought to surface an entire class of new phenomena, which now await thorough experimental investigation. Over the next few years a number of experiments world-wide (at BNL, CERN, DESY and JLAB) will run with transversely polarised beams and targets, providing data that will enrich our knowledge of the transverse-spin structure of hadrons. It is therefore timely to assess the state of the art, and this is the principal aim of the volume. An outline of the book is as follows. After a few introductory remarks (Chapter 1), attention is directed in Chapter 2 to transversely polarised deeply-inelastic scattering (DIS), which probes the transverse spin structure function g2. This existing data are reviewed and discussed (for completeness, a brief presentation of longitudinally polarised DIS is also provided). In Chapter 3 the transverse-spin structure of the proton is illustrated in detail, with emphasis on the transversity distribution and the twist-three parton distribution contributing to g2. Model calculations of these quantities are also presented. In Chapter 4, the QCD evolution of transversity is studied at leading and next-to-leading order. Chapter 5 illustrates the g2 structure function and its related sum rules within the framework of perturbative QCD. The last three chapters are devoted to the phenomenology of transversity, in the context of Drell-Yan processes (Chapter 6), inclusive leptoproduction (Chapter 7) and inclusive hadroproduction (Chapter 8). The interpretation of some recent single-spin asymmetry data is discussed and the prospects for future measurements are reviewed. |