

**Birkar, Caucher**

**On existence of log minimal models. II.** (English) Zbl 1226.14021  
*J. Reine Angew. Math.* 658, 99–113 (2011).

Let  $(X, B)$  be a projective log canonical pair (e.g.  $X$  is smooth and  $B = \sum b_i B_i$  is a sum of smooth codimension one subvarieties meeting transversely with  $0 \leq b_i \leq 1$ ).  $(X, B)$  is pseudo-effective if there is a sequence of effective divisors  $M_i \geq 0$  such that  $K_X + B = \lim_{i \rightarrow \infty} M_i$ . According to the Minimal Model Conjecture, if  $(X, B)$  is pseudo-effective, then it has a minimal model  $\phi : X \dashrightarrow Z$  (in particular  $K_Z + \phi_* B$  is nef so that  $(K_Z + \phi_* B) \cdot C \geq 0$  for any curve  $C \subset X$ ) and if  $(X, B)$  is not pseudo-effective, then it has a Mori fiber space (in particular there is a birational map  $\phi : X \dashrightarrow Z$  and a morphism  $Z \rightarrow W$  such that  $-(K_Z + \phi_* B)$  is ample over  $W$ ). The Weak Nonvanishing Conjecture says that any pseudo-effective log canonical pair  $(X, B)$  is effective so that  $K_X + B \equiv M \geq 0$ .

In this paper, the author shows the important result that the Weak Nonvanishing Conjecture implies the Minimal Model Conjecture and that if  $(X, B)$  is a  $\mathbb{Q}$ -factorial dlt pair, then the birational map  $\phi : X \dashrightarrow Z$  to the minimal model (or Mori fiber space) is given by a finite sequence of divisorial contractions and flips.

For part I, cf. [*Compos. Math.* 146, No. 4, 919–928 (2010; [Zbl 1197.14011](#))].

Reviewer: [Christopher Hacon \(Salt Lake City\)](#)

**MSC:**

[14E30](#) Minimal model program (Mori theory, extremal rays)

Cited in **1** Review  
Cited in **15** Documents

**Keywords:**

[minimal models](#); [nonvanishing conjecture](#)

**Full Text:** [DOI](#) [arXiv](#)

**References:**

- [1] Ambro F., *Tr. Mat. Inst. Steklova* 240 pp 220– (2003)
- [2] DOI: 10.1112/S0010437X09004564 · [Zbl 1197.14011](#) · doi:10.1112/S0010437X09004564
- [3] DOI: 10.2140/ant.2009.3.951 · [Zbl 1194.14021](#) · doi:10.2140/ant.2009.3.951
- [4] DOI: 10.1090/S0894-0347-09-00649-3 · [Zbl 1210.14019](#) · doi:10.1090/S0894-0347-09-00649-3
- [5] DOI: 10.2977/prims/1210167332 · [Zbl 1145.14014](#) · doi:10.2977/prims/1210167332
- [6] DOI: 10.1070/IM1993v040n01ABEH001862 · [Zbl 0785.14023](#) · doi:10.1070/IM1993v040n01ABEH001862
- [7] DOI: 10.1007/BF02362335 · [Zbl 0873.14014](#) · doi:10.1007/BF02362335
- [8] DOI: 10.1134/S0081543809010192 · [Zbl 1312.14041](#) · doi:10.1134/S0081543809010192

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.